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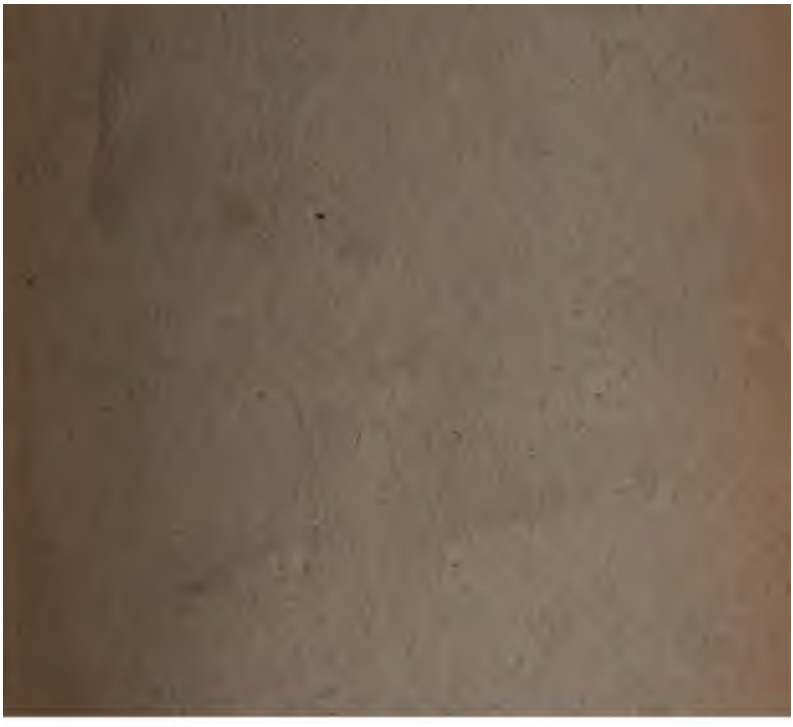

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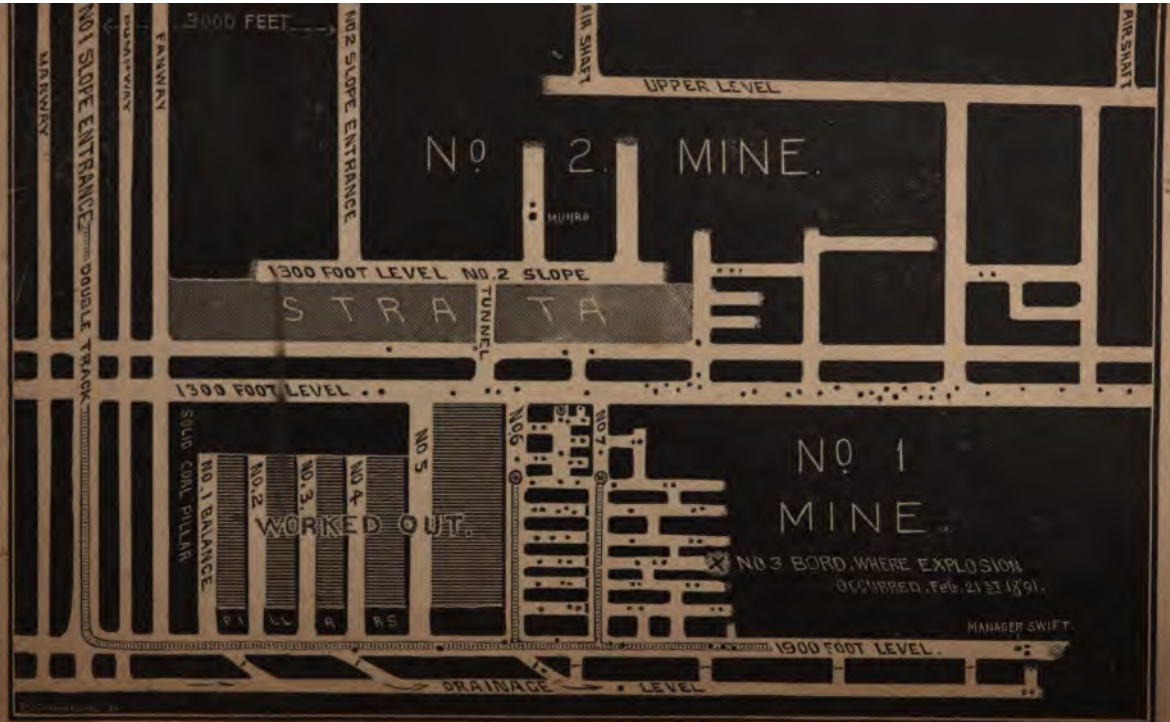

PLAN OF MINE WHERE EXPLOSION OCCURRED.

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ASTOR, LENOX AND
TILDEN FOUNDATIONS.

STORY

OF

The Springhill Disaster:

COMPRISING

A FULL AND AUTHENTIC ACCOUNT

OF

THE GREAT COAL MINING EXPLOSION

AT

SPRINGHILL MINES, NOVA SCOTIA,

FEBRUARY 21st, 1891,

INCLUDING A

HISTORY OF SPRINGHILL AND ITS COLLIERIES;

ALSO,

A Description of the Underground Workings, Mechanical Operations and Mysteries of the Mine; Reviews of other Great Coal Mining Disasters; Coal and its History; Dangers of Mining Operations and Safeguards against Accidents in Mines; Explanation of Coal Mining Terms; Lessons from the Great Calamity, Etc.

BY

R. A. H. MORROW.

FULLY ILLUSTRATED.

ST. JOHN, N. B.
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59 Garden Street

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Entered according to Act of Parliament of Canada in the year 1891,
By ROBERT A. H. MORROW,
In the Office of the Minister of Agriculture, at Ottawa.

To the
Surviving Sufferers
of the
Dreadful Explosion at Springhill Mines,
and all who have been
Brought to Mourn by that Terrible Calamity,
this Work, which Relates the Thrilling
Story of the Whole Scene, is Dedicated by
The Author.

ERRATA.

On page 197, 7th line from top, ought to be 1886–87, instead of "1885–57."

Page 239, 10th line from bottom, ought to read "1833," instead of 1883.

Page 244, on 12th line from bottom, instead of "that year," it ought to be the year 852.

PREFACE.

No event in the history of Canada has startled the nation and touched the hearts of all classes more than the terrible calamity at Springhill Collieries. By this dreadful catastrophe one hundred and twenty-five brave miners lost their lives, leaving destitute two hundred and thirty-four orphans, widows and widowed mothers to mourn their bereavement.

The mighty destructive forces of nature having been permitted by the Almighty to rush forth out of their chambers, causing this calamity, for some wise purpose we cannot now understand, it is fitting that some landmark should be fixed to note the momentous event. The narrative of this disaster, in all its bearings, is recorded in the following pages. The writer, having had facilities for obtaining authentic information, and having explored the mines previous to the explosion, and visited the place afterwards, has undertaken to issue the work, assured that its mission will accomplish some good. It will be seen by the narrative that the great moral lessons which should be learned by this calamity have not been overlooked.

Coal-mining being one of the greatest industries of the day, and the mode of formation and deposit of coal-measures forming one of the great unsettled problems of geology, the writer has included a chapter relating to these matters, believing that it will be read with interest. He also describes the underground workings of the colliery, and relates his experience of the "mysteries of the

mine," as they appeared to him during his visits to that gloomy region.

The history of the mines where the explosion took place, and the town of Springhill that has arisen about them, being considered of special interest to the reader, is given a prominent place in the work. References are made to the other great coal fields of Nova Scotia, which are so closely allied to that in which the sad event occurred. The disastrous explosions at the "Ford Pit" and "Drummond Colliery" are also alluded to. "Safeguards against accidents in mines," it is hoped, will be of some value to mining operators. The Glossary is designed to explain terms used in connection with coal-mining, few being familiar with these terms.

To all who have assisted in any way furnishing material for this volume, the writer would acknowledge his deep sense of indebtedness, and would gladly give due credit to each source from which he has obtained information. But, as this could not be done without detracting the interest of the work to the reader, it is hoped that this general acknowledgment will suffice for all.

The writer's desire in some measure will be attained if the reader of this volume, after perusing its pages, can sincerely say—

> "Blest the day that's past without a sigh;
> Blest the day with a sigh if we can only dry
> The tears of those who have more cause to mourn."

St. John, N. B. R. A. H. M.

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THE

Springhill Colliery Disaster.

CHAPTER I.

The Startling News.

On Saturday, February 21st, 1891, the world was startled by the tidings that a sad disaster had occurred at one o'clock that day in the west side of the Eastern Slope of the Cumberland Railway and Coal Company's Collieries at Springhill, Nova Scotia.

This melancholy announcement was somewhat alleviated by a ray of hope that the loss of life might not be so great as was at first anticipated. This hope, however, was soon dispelled by a realization of the fact that a terrific explosion had taken place in the deep and darksome pit, by which one hundred and twenty-one of the brave miners had been instantly killed, and seventeen injured—some of them fatally—leaving fifty-eight widows, one hundred and sixty-nine orphan children, and eight widowed mothers to mourn their loss.

The disaster was rendered still more heart-rending when it came to be known that many of the bodies of those who had lost their lives in the fatal pit were scorched, mangled, and buried among the ruins, thus rendering this disaster one of the most terrible calamities known in the history of coal-mining operations. As the appalling magnitude, dreadful suddenness, and heart-rending scenes of this terrible accident became known, the Christian world felt the throes, and messages of sympathy and aid came pouring in from every quarter, among which were telegrams from Lord Stanley, Governor General of Canada, and our gracious QUEEN, whose widowed heart felt the pangs of her sorrowing subjects, although in the humble sphere of a miner's home. On hearing

THE AWFUL CRY,

"Explosion at the mine!" the inhabitants of the sorrow-stricken town rushed to the mouth of the pit, if happily they might be able to render assistance. It was needless to attempt consoling the vast assemblage. The instinct of every one composing that sorrowing crowd seemed to tell them that some friend was among the lost. Although many had escaped to the surface without injury, yet it was

soon known that nearly one hundred and fifty of those who had been to work in the depths below were missing, and that among these were husbands of those wives and the fathers of those bonnie bairns and the brothers of those older children. Even, too, among the absent were the tender sons of those aged parents whose hoary heads must soon descend with sorrow to the grave, and the orphan boy of that poor and lonely widow, whose heart must now bleed in solitude.

Although no one present could tell the story of how the accident occurred, yet none could doubt its reality or fail to believe that all who had been working in the vicinity of the fatal occurrence had been ruthlessly killed without a moment's warning. All that could be gathered from those working on the surface of the pit at the time of the explosion was that a tremor of the ground was felt by them, whilst those who were engaged in other portions of the mine, and had escaped, testified that a dull report coming from a distance reached their ears, followed by

INDICATIONS OF DESTRUCTION,

when they suddenly dropped their implements and made a rush for life.

All faces gathered paleness as the rescued told their tales of woe, for it was now too evident that a dreadful explosion had not only taken place in the mine, but that the poisonous after-damp had done its work of death in the pit which had long been considered one of the most secure coal mines in the world. Before proceeding with details, a glance at the location of Springhill and its Collieries will enable the reader to understand where the accident occurred.

CHAPTER II.

Scene of the Disaster.

The town of Springhill, where the direful event occurred, is beautifully situated in the central part of Cumberland County, five miles west of the main track of the Intercolonial Railway, and on the eastern side of the Springhill and Parrsboro Railway. It is one hundred and twenty-six miles distant by rail from Halifax; twenty-two from Amherst; twenty-one from Oxford; twenty-seven from Parrsboro, and thirty-eight from Pugwash.

Coming down the Springhill and Parrsboro Railway from its junction with the Intercolonial, the town bursts upon the view, presenting a pleasing appearance. Its dwellings cover an extensive territory on the south-western side of a gentle elevation, said to be 1,094 feet above the level of the sea, and six feet lower than the highest peak of the Cobequid Mountain range. The elevation being gradual for some distance around, there is no abrupt summit to the hill. Standing on the highest point of this elevation on a bright summer morning, as the writer did, and sweeping the eye in every direction, the scenery is

romantic and grand. The blue hills of New Brunswick far away in the distance, skirting the north-western horizon, and the majestic forest waving on the more adjacent hill sides, with scattered villas at their base, whose curling smoke ascend the skies, presents a picture seldom seen on one landscape.

The Collieries,

which have been opened to date at Springhill, are five in number. They are distinguished as the East, West and North Slopes, the Aberdeen Pit, and the Syndicate Slope. The East Slope is also known as No. 1; West, No. 2, and North, No. 3. The Aberdeen Pit and Syndicate Slope have not been much worked as yet; the others are in full operation.

These Collieries are located on the western side of the town, and their entrances are at a respectful distance from the business portion. The entrances of the East and West Slopes are each about half a mile from the Post Office. The former is also 3,000 feet in a northerly direction from the latter.

By looking at the Plan of these—Nos. 1 and 2 Mines—it will be seen that each of their 1,300 foot Levels are connected by a tunnel running through a dividing strata of eighty feet in thickness,

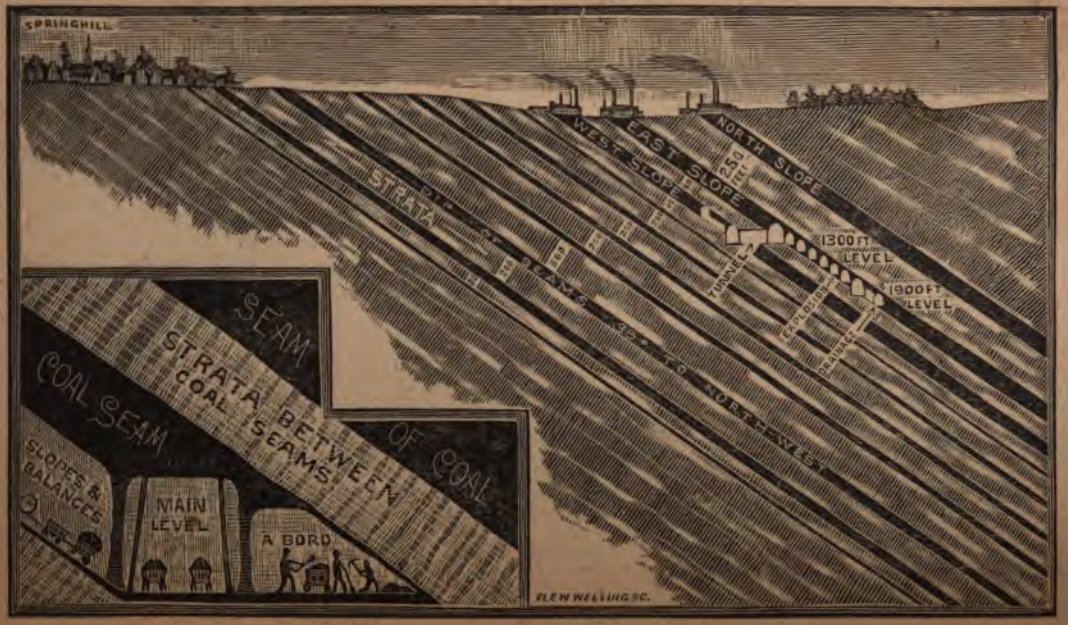
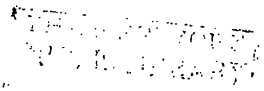


CHART OF SPRINGHILL COAL MEASURES.



and that each has its separate entrance or slope. This tunnel is for haulage and ventilation, the coal mined on the upper level of No. 1 Pit being taken through this tunnel into the bottom level of No. 2 Pit, and thence up the slope to the surface.

Although apparently otherwise on the plan, the East Seam overtops the West. The North Seam also overlies the East, and is separated from it by 250 feet of strata. The North and East Seams being thus separated, the former does not appear on the plan. The true position of each of these seams will be seen by referring to the Chart on page 23.

There being no perpendicular shafts to these mines, they are entered by slopes, which are fully described in chapter "Mechanical Operations of the Pit."

From the Bottom of Each Slope

the mine is excavated in various directions, forming a labyrinth of streets, cross streets, alleyways, and courts, which are known by a variety of names, such as Levels, Balances, Bords, Shutes, Planes, Tunnels, Manways, Gangways, Chambers, etc., all of which are fully explained in the Glossary Department.

By looking at the plan of the mines, the reader will see that the "Balances" of No. 1 Slope run

parallel with the main entrance from the foot Level up as far as the coal is mined in that direction, and are numbered accordiug to their distances from the bottom of the main slope. It will also be seen that the "Bords" running from these "Balances" are numbered from the bottom Level upwards, until the head of the Balance is reached.

Following the tracings on the plan, beginning at the foot of No. 1 Balance, and proceeding along the main level until No. 7 Balance is reached, and then counting the Bords upward to No. 3 Bord, the exact spot where the explosion is supposed to have taken place can easily be discovered.

THE EXPLOSION OCCURRED

in No. 3 Bord of No. 7 Balance, which is three-quarters of a mile west from the foot of the main entrance leading into No. 1 Pit.

From the place of exploson the burning gas must have rushed forth with terrible force, as it was in this and adjoining vicinities that all the mutilated bodies were found, and every one was evidently burnt or torn to death.

Every man in Nos. 6 and 7 Balances, and their connecting Bords, and along the main level as far as No. 3 Balance, were no doubt killed instantly by the

force of the explosion. The number of dead bodies found in this region can easily be counted on the plan, which also shows the place where each dead body was found in all parts of the mine.

The space where the explosion did its greatest havoc covers an area of about 2,000 feet, and as the doors, ventilators and stoppings in this neighborhood were all torn away, allowing the fire-damp to escape to other apartments of the mine, it rushed along the passages

WITH TERRIBLE SWEEP,

like "a rushing mighty wind," overwhelming everything at all movable in its course. This deadly gaseous element was immediately followed by a cohort of flame of awful fierceness.

These fierce elements of destruction not only swept along the 1,900 foot level of the Eastern Slope, but swept with dreadful fury up into the 1,300 foot level of the same workings, and through the tunnel into the Western Pit, carrying immediate death to some who were in that direction, as will be seen by the number of black dots on the plan, each of these dots representing the place where a dead body was discovered.

CHAPTER III.

The Wave of Sorrow.

At seven o'clock on the morning of the day of the fatal explosion, the miners engaged in the East and West Slopes descended to work as usual. The Aberdeen Pit had been inactive for some time, and owing to lack of empty coal cars to receive the output, the North Slope was also idle that day. These three collieries give employment to about 1,350 men and boys. From sixty to seventy horses are also to work in the pits. The men and boys are distributed about as follows: In No. 1 Pit, 300; in No. 2, 300; in No. 3, 400; and on the surface, 350. Consequently, 600 miners went to work that morning in the East and West Slopes with all the buoyancy of youth and manhood. No manifestations of nature appeared to warn of the sad event that was soon to transpire. It is true that in some bosoms there was a

Foreboding Apprehension

that some dire calamity should happen in the mines at some distant day.

SCENE OF EXPLOSION.

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This fear was engendered by a current report that an old woman named "Mrs. Coo" had suggested to some one that something would happen about the mines during the coming month of May. As a consequence of this report, a committee was appointed to examine the mine, which they did, and found no visible cause for alarm, as will be seen by a portion of the evidence adduced at the inquest. Notwithstanding the result of this examination, a few of the miners still retained a germ of their former timidity, on the plea that "Mother Coo" was generally known to tell the truth, and hence their apprehensive musings. That day the work went on in the mines as usual, without mishap or interruption until noon, when a stoppage of half an hour was allowed for dinner. After partaking of the noon-day meal the machinery was again put in motion and operations proceeded until seventeen minutes to one o'clock, when

A Terrific Explosion

took place, the report of which was heard like sullen thunder, resounding through many portions of the mine. Those of the miners who were not instantly killed by the explosion knew what it meant, and fled for their lives, and many thus escaped the fearful doom that must have overtaken them had they

remained at their posts of duty. As the lamps were quickly extinguished by the effects of the gas, and the miners left in utter darkness, escape was almost impossible. However, by strenuous efforts, many gained the surface, and thus their lives were saved.

Those who were in the vicinity of where the explosion occurred, were doubtless killed instantly, as has already been stated. Those further off, and not killed by the explosion, evidently fell victims immediately by inhaling the first breath of

The Deadly Choke-Damp.

A number of miners, including Charles Burrows, heard the report some 600 feet from where the explosion took place and at once felt the oppression of the damp, and instantly threw themselves flat on their faces. No matter in what direction they attempted to go they encountered gas, through which they could hardly force their way. After running a great distance in this manner they got to pure atmosphere and finally reached the top of the mine. The last to reach the surface, of those alive, were John McKinnon, George Davidson and John Lockhart. These were working in No. 2 Mine, and were not injured in any way.

Those who had made their escape from the pit could tell nothing as to what the loss of life was. Many testified that as they ran towards the entrance of the pit they knew some of their companions to fall over from the effects of poisonous gases, stating that in every case where it was possible to do so they lent those who had been overcome the assistance they required to reach the surface.

As nearly every one of those known to have been in the mines had relatives or dear friends among those who had assembled at the mouth of the pit where the explosion occurred,

THE EXCITEMENT WAS INDESCRIBABLE.

Mothers, fathers, sisters, brothers, wives and children ran about in wild confusion, imploring all whom they met to institute a search for their friends. No one could remain unmoved as they saw frail mothers, half clothed, clasping tender little ones to their bosoms, beseeching men who were near at hand to find out as soon as possible if their husbands, the fathers of their dear babies, were among the dead. Despite the cold rain storm that prevailed, the women and children remained around the pit until they were assured of the fate of their friends. It was

ONE OF THE SADDEST SCENES

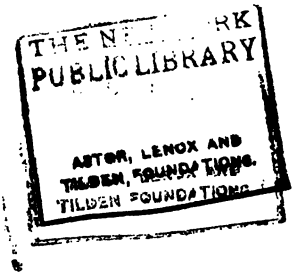
ever witnessed in Canada. Stern men wept like children as they beheld the wailings of those who refused to be comforted for the loss of dear ones whom they believed were laid low in the

COLD EMBRACE OF DEATH.

Although every effort was made to ascertain the number of those remaining in the pit, it was impossible to do so for some time, as a large number of men and boys had run to their homes, as soon as possible after reaching the surface. However, it was believed that the number would reach one hundred and fifty at least. Large bands of men stood ready to descend the Eastern Slope as soon as it was deemed safe to do so.

As many of those who had come to the surface had made their exit from No. 2 Slope, it was soon discovered that that pit had also been affected by the explosion. In a short time a crowd assembled around its surface and the work of rescue commenced without delay.

SAD SCENE AROUND THE PIT.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CHAPTER IV.

Searching for the Dead and Injured.

About fifteen minutes after the explosion, Wm. Reese, Overman of No. 1 Slope, and Ralph Turner rushed down into No. 2 Slope to ascertain what the result was. After discovering one or two of the injured, whom they took to the surface with all haste, they returned immediately, accompanied by Malcolm McMillan, Alex. Chisholm, Moses Jones, Thomas Whittle, John Matheson, jr., and some others, who organized themselves into a volunteer relief party. In an incredibly short time these gentlemen had brought to the surface sixteen injured, including Cyrus Munroe, of Port Elgin, who was found unconscious lying a short distance from his dead butty, James Morrison, but under careful treatment soon recovered. Mr. Reese carried Mr. Munroe on his back from where he was discovered to the bottom of the slope. The place where Mr. Munroe was found will be seen by referring to the plan of the mine. From the bottom of the slope

the dead and injured were conveyed in boxes to the surface up the main entrance by the machinery for hoisting coal. On arrival at the surface the injured were taken to their homes without delay.

Among those who went into the West Slope Saturday afternoon in search of the dead, besides those already mentioned, were John Johnston, John Leadbeater, Charles Rennie, John Moffatt, R. W. McDonald, Jesse Armishaw, Daniel Murray, and A. A. McKinnon. The latter went down to look for McKinnon's brother, whom they found among the dead. Jesse Armishaw's mission was also a sad one, as the bodies of his sons Jesse and Herbert, and that of a young man named Ernest Bainbridge, who lived in his family, were all discovered lying dead.

The rescuing party worked heroically at the peril of their lives, some of them carrying dead bodies on their backs, and ascending and descending into the pit many times during the afternoon.

During the First Descent

of Messrs. Reese and Turner they attempted to go into No. 1 Slope, where the explosion occurred, but they found the smoke and after-damp too great to

venture. Half an hour afterwards, however, Mr. Reese and party succeeded in getting into this place, which an eye-witness describes thus: "Falls of stone and coal, cars all blown to pieces, rails bent like hoops, and general destruction — very smoky, and dead men and boys lying in all directions."

At this time the smoke was coming from No. 1 Slope, through the upper ends of Nos. 6 and 7 Balances, so thick that some of the men were afraid that there was fire existing somewhere in the vicinity, and that there might be another explosion.

Of this Mr. Reese was fully convinced, but was so anxious to get out the bodies, which were lying around in all directions, that he did not make his convictions known to the others at the time, some being of the opinion that there was no fire. However, James Simpson, Underground Manager of No. 3 Pit, who had witnessed the smoke, agreed with Mr. Reese that fire existed, and that it was becoming dangerous, and so the party agreed to give up the search for two hours in order to ascertain the result of the fire, leaving the pit at six o'clock in the evening, by which time forty-four dead bodies and sixteen injured had been taken to the surface of No. 2 Slope.

THE FIRST DEAD BODY FOUND

was that of William H. Turner. Notwithstanding this agreement to leave the pit for two hours, when one hour had passed, William Lorimer called on Mr. Reese at his house, where he was resting, and informed him that there was a boy missing that possibly might be living and groping around in the dark. They descended at once in search of this boy, but did not find him, as he had gone from where he was working in No. 2 Slope to No. 1, a short time before the explosion, and got killed. His name was George Bond. When the two hours had expired the searching parties returned into No. 2 Mine and worked all night.

At four o'clock Sabbath morning, Manager Reese, in company with Joseph Robertson and Allen C. McKinnon, went down the East Slope in search of fire, which they expected to find. After being satisfied that fire existed they returned to the surface to get buckets and more help. At six o'clock Mr. Reese, with John Dunbar, Manager of the "Tom Pit," Pictou, Thomas Scott, and about twenty others, went down into the pit again, and extinguished the fire with water. This fire was in No. 2 Bord of No. 6 Balance, where a large

quantity of timber was scattered about, and had it not been promptly put out the result might have been deplorable.

At the East Slope,

local volunteer relief parties also went down into the pit of death, a short time after the explosion, and the scenes of carnage and wreckage which met their gaze must be retained in memory while life lasts. It was a terrible undertaking, but nothing could daunt the brave men, each being wholly animated by the conviction that to relieve suffering and save the life of a fellow-creature even at the risk of his own life was his present duty, and hence they descended to look for their missing comrades regardless of consequences. What brave deeds many did that day will never be known. Those who volunteered to enter the mines in search of victims were many and prompt, and their bravery in facing death by going into the pit so soon after the explosion is worthy of the highest commendation. As an illustration of the heroism manifested in many cases, one man, whose wife earnestly besought him not to venture going down into the pit, as there was danger of him losing his life,

could not be persuaded by her entreaties, but descended and brought bodies from beyond over falls which few others, it is said, could climb.

Some who descended into No. 1 Pit first after the explosion were borne back to the surface suffocated and unconscious. Joseph Robertson, one of the first men who went to the rescue at No. 1 Slope, was so overcome by the after-damp that he was compelled to crawl on his hands and knees for quite a distance. After gaining the surface, and getting properly survived and adjusted, he returned to the pit and worked heroically day and night for three days. He and Malcolm Blue were among the greatest workers, and discovered a large number of the dead.

The heroic courage and endurance of Overman Reese, in leading men to the rescue of the wounded and recovery of the dead, was admired by all, and one of the rescued parties has since acknowledged his indebtedness to him by a tangible recognition.

Among the First Volunteers

to enter the East Slope after the explosion were Joseph Robertson, Malcolm Blue, William Ray, J. Madden, James Harvey, H. Bunt, John D. Beaton, William Murray, James Miller, George Morrison, George Oulton, Charles H. Weller, James

Lambert, Daniel O'Brien, and William McGilvray. A number of these parties did not reach the surface, but returned immediately from the bottom of the slope to look for their companions, while the atmosphere was alarmingly impure with coal dust and heated smoke.

These first searching parties proceeded along the level as far as they were able to venture, and in a short time had rescued all the living. Among the injured were five boys, named Willard Carter, John Conway, Dannie Robertson, Adolphus Landry, and Daniel Beaton, all of whom have survived but Willard Carter, who died at ten o'clock that night.

At No. 3 Shute a fire, consisting of some wood and clothing, was discovered. This fire was put out by James Lambert. Had it been allowed to remain a short time longer the consequences would, no doubt, have been serious.

Whilst these rescue parties were at work endeavoring to save the living in No. 1 Slope, Underground Managers Conway, Simpson and Hargreaves, Assistant Manager McInnis, Deputy Inspector Madden, and some other colliery officials were coming to the mines, with all haste, by special train from the Springhill Junction, having left Springhill Station by the noon train to attend a meeting of Mining

Officials of Cumberland County, to be held that day at Maccan, for the purpose of forming a Society for the Protection of Mining Officials. After arriving at the Junction, these gentlemen had been called back by telegram, announcing that an explosion had taken place at the mines.

On Arrival at the Mines,

Underground Manager Conway procured a lamp, called for volunteers, and at once descended No. 1 Slope, accompanied by Assistant Manager McInnis, Messrs. James Ferguson, Peter Shannahan, A. D. Ferguson, Malcolm Blue, James Miller, Joseph Robertson, and some others. These gentlemen pushed into the mine as far as they were able to go with safety, and in a short time some good work was accomplished. Ventilation being the first essential required to prevent further death from the effect of poisonous gases in the mine, men were set to work constructing partitions of canvas, in order to replace the brattices that had been destroyed. The use of this brattice work is given in the Glossary at the end of the book. After Mr. Conway and party had descended many others went down to endeavor to find fathers, sons, brothers, and other

relatives, who had perished in the mine. Alexander McInnis, Assistant Manager, led one searching party along the level as far as No. 6 Balance, and up that incline until overcome by the after-damp, when he had to be assisted out of the pit. Cecil Parsons and Underground Manager Hargreaves managed to reach the Western Slope in safety. General Manager of the Company, J. R. Cowans, also went down to see for himself the state of affairs in the mine. Many dead bodies were seen among the ruins, but owing to the dangers attending the work of rescue at this time, little progress could be made. Owing to the depth of debris in many places, rescuers were compelled to crawl and climb, carrying a dead body on their back or arms, and their lamp in their mouth. Still the work of rescue went on till six o'clock, when Underground Manager Conway, in consultation with other officials, advised that as all the living had evidently been taken from the pit, all hands should leave the mine for some time, in order that a free current of the air, forced into the pit by the powerful fan on the surface, might drive out the noxious damp. According to this announcement of Mr. Conway, further searching was discontinued in No. 1 Slope for five hours.

ONE OF THE HEROES

who went down into No. 1 Slope on Saturday to assist in the work of rescue and with refreshments to the men who were at work, was Rev. David Wright, of Springhill. As Rev. Mr. Wright's experience that afternoon will give the reader a better idea of the state of the mine than anything the writer could say, we give the narrative in his own words:

"I was on my way to River John, and had got to Springhill Junction. A special was sent down, and with some others I returned. Managers all went down into the mine. I entered with some refreshments. With some others I hurried along the level towards the scene of the explosion. I had given away my handkerchief, so I cut the lining out of my vest and put it over my mouth. We got in a long way when we met some other men, who told us that the manager, Mr. Conway, had gone forward, and left word that no one was to proceed further, as he would come out by the Mine Bord. We got anxious about him and his volunteers. So one of the men and I went down the Mine Bord till we met them. Some of them were pretty well gone with the after-damp. We kept together, shouting to each other to be sure that no one dropped down. When a man gets after-damp he simply lies down and falls asleep. When we reached the main level we were joined by the others. Mr. Conway said there was

RESCUING PARTY IN THE MINE.

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nothing living in the mine, and gave orders that all were to leave, and in the course of four or five hours the after-damp would all be driven out. We left the mine at six o'clock. The scene along the level was pitiful. The explosion had rushed toward the bottom of the mine. Not much damage was done, only the props knocked out, which caused the sides and roof partially to fall in. The first thing we saw on our way in, after leaving the bottom of the slope, was a couple of horses lying dead. A little further on, and two others were standing, one of them literally burned red—at least the side next to us was red flesh. It was killed. Then right in from these the debris blocked the way. Now and again a large fall, under which was a horse, part of it visible. The driver was, we knew, somewhere near. I stayed at the slope all night. Went down at four o'clock in the morning for a time, and then went home. Went down East Slope at twelve o'clock, Sabbath, in company with James Harvey, Hugh Marling, Alexander Lorimer, G. Anderson, James McSavaney, and two others, whose names I cannot remember. We went along the level. Four went up No. 6 Balance. Lorimer, Anderson, McSavaney, and myself, went along and up No. 7 Balance. We brought down

THE BODY OF THOMAS WILSON,

the shot firer. We came out, Lorimer carrying the body on his back, Anderson steadying behind, I in front with the lamp, and McSavaney behind with another lamp. We

walked in this manner a long way till we got a stretcher, on which we put the body. Those out of No. 6 Balance joined us, carrying the remains of William McKee. On our way out with these bodies, we met another lot coming in, who went up No. 6 Balance. When we reached No. 4 Balance the roof was falling in. I was in front, and drew back. James Harvey went on to examine, and in a few minutes reported that it was not safe to go on, and we sat down for fifteen or twenty minutes. We were here joined by four or five others, carrying another dead body. After the falling had ceased, Harvey examined again, and reported all safe, and we pushed onward and reached the bottom of the slope in safety. It was a weird sight in one place to see two bodies sitting each with a safety lamp in his hand."

THE WORK OF RESCUE WAS RESUMED

at half-past eleven o'clock Saturday night, a large number of volunteers descending and working vigorously without cessation during the night, unless when compelled by fatigue or nausea to retire.

Mr. Conway, Underground Manager of No. 1 Slope, on descending, directed a crew at once to collect all the living horses throughout the mine and put them in the stables at the foot of the slope. Mr. Conway also endeavored to remove the wreckage from the main level as far along towards the

vicinity of the explosion as possible, so that a trolley might run along the rails to convey dead bodies to the foot of the slope, where they were hoisted to the surface.

During the night great progress was made, two thousand feet of the level having been cleared, and the worst obstructions removed from the passages leading to where the men had died.

At half-past six o'clock on Sabbath morning, Mr. Conway was so overcome through the effects of fatigue and after-damp that he left the pit and remained on the surface until eleven o'clock, when hemorrhage set in, and he bled so freely that he was compelled to go home and remain under medical treatment for several days. Meantime, Thomas Scott acted in his place.

SABBATH MORNING,

on arrival of Mr. Conway at the surface, large crowds of volunteer relief parties went down, as the mine was then considered free from the dangerous damp by Inspector Gilpin and Deputy Inspector Madden, who went into No. 1 Slope and passed up into No. 2. The local searching parties were assisted by a number of brave men who had come by rail during the night from Stellarton and Westville. A

crew from the Joggins also rendered valuable assistance, and by six o'clock on Sabbath evening over one hundred dead bodies had been recovered.

That day was one to be remembered. It did not seem like Sabbath. Few realized it was a holy day. The sweeping grief was so great that the Sabbath sacredness was overwhelmed, and the sanctuary of God invaded thereby.

Some of the bodies found were horribly mutilated, and a few could not be recognized only by their clothing. Others were quite natural. The position of over fifty of the dead recovered showed that they had not been killed by the force of the explosion, but were overcome by the after-damp while trying to escape. It was evident that none had escaped who encountered the full blast of the first sweep of the fire-damp. It could be seen, by the way some held their arms, and with their safety lamps in their hands, as they lay on the bottom of the pit on their faces, that they had

DIED FROM SUFFOCATION.

Many, when found, although cold and still in death, looked as peaceful in the face as though they were merely sleeping. In a few cases the clinched hands and twisted limbs showed that the poor men had died in convulsions.

The general evidence was overwhelming that death was sudden in the majority of cases. One man, when killed, had been in the act of smoking, and the stem of his pipe, held by the mouth, remained until taken out after recovery. Another had a mouthful of bread, as if in the act of eating his dinner. A few of the dead were found standing in the most natural positions. One was leaning against a post.

The bodies of Daniel Lockhart and Peter Gallagher, when recovered, showed that Gallagher had a firm hold of Lockhart, as if assisting him to climb over a fall leading from the bord where they were killed. Two men had clasped hands, and evidently ran until the damp overtook them, when they fell on their faces and died with their hands united. The body of one man had his dinner-can strapped on his back. Two brothers, named David and James McVey, were locked so tightly in each other's arms that they were taken out and conveyed to their home in their embrace of death. The rescuing parties met with many other

UNPARALLELED SIGHTS

in their search for the dead. They also found much difficulty in some places proceeding with the work,

owing to the falls of timber and other debris blocking up the way, and concealing dead bodies. In the vicinity of where the explosion occurred was apparently a total wreck. Six loaded cars, each of which weighed from 1,600 to 1,900 lbs., were completely overturned at the head of the No. 7 Balance. Iron rails were torn from their fastenings and twisted into many forms. The writer saw one of these rails, which was bent like a barrel hoop. His attention was also directed to a shovel found at the place where Manager Swift's body was discovered, the iron portion of which was rolled up like a scroll. In the neighborhood of 6 and 7 Balances the force of the explosion had rent asunder the timbers supporting the roof of the various chambers. One of the greatest havocs was in a bord where the bodies of Richard Dawson and his son Samuel were found by Joseph Robertson. These bodies were in a standing position close to each other, and covered to the neck by the ruins. They were dragged out with the greatest of difficulty, owing to the small space through which the searching party had to crawl. A number of the rescuers in one place had a narrow escape from a break-down. An avalanche of rocks showered down from the roof whilst they were carrying the dead body of

Richard Murphy, which they were compelled to drop at the foot of No. 7 Balance, and run for their lives. This body was taken out three days afterwards by Overman Reese and James Ferguson.

Notwithstanding the enormity of the labor involved, the volunteer parties continued their search night and day, for five days, until Thursday, 26th, at four o'clock, when the last body had been recovered—that of

HENRY SWIFT, UNDERGROUND MANAGER

of the mines, which made the number taken out dead one hundred and twenty-one, besides four of the injured, who have since died, making the whole number killed one hundred and twenty-five.

The searching party who discovered Manager Swift's body consisted of Malcolm Blue, A. D. Ferguson, W. D. Matheson, Neil McDonald, John Colwell, and Luke Harrison. The body was found under about three feet of rock. The face was downwards, and not disfigured. The place where the body was lying was on the main level, about 500 feet from where the explosion occurred.

The last two bodies found previous to that of Manager Swift were those of Archibald Shipley and James Nairn. These bodies were discovered in the

vicinity of where Swift's body was lying. Nairn's body was found on the morning of the 25th, and makes three of the Nairn family killed in the pit.

On the day previous to this date the bodies of William Hyde, Donald McKay, Henry Livingstone, Richard Murphy, John Francis, Andrew Bunt and Neil McLeod were all discovered under heavy falls of stone and coal, which had to be removed before getting at the bodies. On the 24th, the bodies of John Hunter, Roger Noiles and John J. McDonald were found by the searching parties. McDonald was thrown up an incline seventy-five feet from where he had been working. His body was shockingly mutilated, and one arm was missing. Noiles' body was also badly cut and torn. John Gillis' body was taken out of No. 2 Slope on the afternoon of the 23rd. It was thought that he had escaped injury, as his name did not appear on the list of the missing. He was a single man, and belonged to Cape Breton.

After the dead miners had been recovered, the dead bodies of horses were collected, taken out of the pit, and cremated. The number of horses killed was seventeen.

ENGINE HOUSES, NO. 1 SLOPE. | CARPENTERS' SHOP, USED AS A MORGUE.

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CHAPTER V.

Care of the Wounded.

The first duty devolving upon those who had charge of the mines was to look after the injured, and this was promptly attended to. As soon as the state of affairs was learned, J. R. Cowans, General Manager, telegraphed at once to Amherst and Parrsboro for all the Doctors that could be spared in these towns to come on with despatch. This request was promptly responded to by Drs. Black, Hewson, Allen, McDougall, Bliss and Campbell, of Amherst; and Drs. Boggs, McKenzie, Babbitt, Atkinson and Rand, of Parrsboro. When word of the disaster had reached Oxford, Drs. Cook and Morrison, of that place, started immediately with their operating cases, expecting that there would be a larger number of amputations and other surgical operations to perform.

By the time these medical gentlemen had arrived all the injured had been brought out of the mines, and carefully treated by Drs. Cove and Hayes, who reside in the place. Dr. Bayard, another physician of Springhill, would also have been in attendance, but owing to sickness was confined to his house. The physicians from Amherst, Oxford and Parrs-

boro, however, did everything that they could to assist alleviating the sufferings of the wounded. But, outside of the seven who had been brought out burned, and several others partly suffocated by the after-damp, no medical aid could avail anything.

Explosion occurred seventeen minutes to one o'clock, and no living person was removed from the mines after two o'clock. As members of the relief parties were being constantly returned to the surface, badly affected by the after-damp, it was deemed best to station medical men at the pit heads for the purpose of attending to such cases without delay. Dr. McDougall, of Amherst, and Dr. Atkinson, of Parrsboro, were stationed at the West Slope, and at the East Slope Drs. Boggs and Babbitt, of Parrsboro, and Drs. Cove and Hayes, of Springhill. All the other medical men returned to their homes that evening. Those stationed at the entrances to the slopes remained at their posts of duty until six o'clock Sabbath morning, when it was considered there was no more danger, thorough ventilation having been restored to the mines. The following is a

RECORD OF INJURIES SUSTAINED BY EACH individual and the result in each case:

Willard Carter had a severe gash on face just below left eye, extending about one and a half inches

down side of face, and obliquely inward and upward, so that it could be probed to a depth of five inches. Besides this, he was seriously burned about the hands and face. He remained in a profound stupor until 10 o'clock that night, when he died. He was thirteen years old, son of Reid Carter, who was killed with his eldest son in the mine, and not recovered until the following morning.

Joshua McNeil was taken to his boarding house in a state of stupor, and was thought simply to be affected by the after-damp. He soon developed violent convulsions, and died about 8 o'clock Saturday evening, showing evidence of having sustained a fracture at base of the skull. He was twenty-one years of age, and unmarried.

Neil S. McNeil was severely burned on hands, arms and face, and side of body. He died one week after explosion from exhaustion, resulting from extent of surface burned. He was unmarried, and twenty-three years of age.

Henry Nash, severely burned about body, hands, arms and face, died on fourth day from shock and exhaustion. His age was twenty-four. His family consisted of wife and one child.

Dannie Robertson, the hero boy referred to on another page as saving Willie Farris, the little

trapper, was badly burned about the head, face, arms, and side of body. He was in a critical condition for some days, but is now considered out of danger, although suffering great pain at time of writing (May 1st). His age is fourteen years.

Willie Farris, a trapper boy twelve years old, who was saved by Dannie Robertson, had the tips of his ears slightly blistered, and small blisters on his hands and side of his face. He was terribly frightened and bewildered in the darkness of the pit, but was all right again in a few days.

Daniel Beaton, a lad of thirteen, who was rescued by an older brother, had his face, hands and head badly burned, and two severe wounds on head, one of which laid a portion of the skull bare. His recovery was rapid.

Adolphus Landry was severely burned about the face, hands, arms and body. Catching a glimpse of the flame of fire as it came, he put his hands over his face, and dropped behind the horse he was driving. The horse was killed and partly falling on him, thus pinning him in and saving his life; his sufferings were so intense before he was rescued that he was praying that death might come and relieve him. He was fourteen years of age, and is recovering.

James Liddle was working in No. 1 Slope, and got hurt coming up in the boxes, there being such a crowd of men that he could not get low enough, and got jammed against the roof. The force of the concussion produced injury to the spine, sufficient to cause paralysis of the lower parts of the body. He was taken to the Halifax hospital, and is improving slowly. The following letter, which he sent from Halifax to the writer, will be read with interest:

VICTORIA GENERAL HOSPITAL,
Halifax, N. S., April 24th, 1891.

DEAR SIR: Your favor of 22nd to hand, and in reply would say: At the time of explosion I was at the bottom of No. 1 Slope, and all at once my light went out, and then I smelt gas, and knowing something was wrong, I at once tried to make my escape, and almost got up to the surface when I was struck on the back by a boom. When brought to the bank head I was senseless. When I came to, my legs, from body downwards, were paralyzed. I was taken immediately to my boarding house, where I stayed until removed to the hospital, where I have been slowly improving. Hope to get around again in a few months. The things published about me are wrong. They have got my name "David" instead of James, and my age "22" instead of 16 years, which it ought to be. This is about all the information I can give you in regard to the Springhill explosion. Yours truly, JAMES LIDDLE.

John Conway, the thirteen year old son of Wm. Conway, Underground Manager of No. 1 Slope, was slightly affected by after-damp; his escape from further injury was a miracle. His case is referred to in another chapter.

James Daniel McDonald was poisoned by after-damp; he had violent convulsions for four or five hours. When he recovered from the effects of the damp he had lost his reason, and at time of writing it had not been restored, but his symptoms were favorable.

Cyrus Munroe, Rodger Lewis, John Dykens, Gordon Carmichael, David Merritt and Hyall Noiles, were all affected more or less severely by the after-damp, but soon recovered under medical treatment.

Among those who formed the rescue parties the following were severely affected by the after-damp: Alex. McInnis, Assistant Underground Manager; Wm. Conway, Underground Manager, No. 1 Slope; Malcolm Blue, Thomas Fletcher, George Kitchell, Jesse Armishaw, Thomas Foster and Thos. Brown. As the condition of some of these are referred to in other departments, the extent of their injuries are omitted in this connection.

Of persons affected by the after-damp among the rescuers, and those who had been discovered in the

mine, Thomas Brown was the greatest sufferer, who recovered. After coming out of the pit he was taken to the office of Dr. Cove, and remained for about eight hours in terrible convulsions. It took four or five men constantly to hold him on the couch. He was removed to his home, and had fully recovered in twenty-four hours after being injured.

Many others were affected by the after-damp, but as they did not require medical treatment their names are not mentioned in this chapter.

CHAPTER VI.

Scenes at the Morgue.

During the five days in which the dead bodies were being brought up out of the pits, many of the scenes at the Carpenters' Shop, at the mouth of the East Slope, which was used as a Morgue, were heart-rending, and shall never be forgotten by the spectators. The remains of many who had perished in No. 1 Mine were taken to this place after coming to the surface that they might be prepared for identification by their friends and interment. At times it seemed that none remained in the town who were able to run to the Morgue. Benches were arranged within the building, and the corpses, after being washed, were laid on them. Those in charge of the Morgue were Wm. Henderson, Samuel Richmond, Samuel Russell, and John F. McDonald. Others tried it also for a time, but could not endure the nervous strain. Although a large number of the dead were natural, yet others were burnt and mutilated beyond recognition, and the place had the semblance of a veritable slaughter-house for a

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time. Remains of some were brought in and laid on the table, over which the veil must be drawn, lest the deformity of death might distress the reader.

However, the following case is too important to leave unnoticed. The body of Lemuel Morrison's 13 year old son, Thomas, was cut in two, and otherwise mangled beyond recognition. The father had been through the morgue several times vainly looking for his son, and had passed and repassed this body, having satisfied himself that it was not the one he sought. Finally the mother came, and after looking over all the other bodies in the place, asked her husband where the body was he told her about. He took her to the lifeless form, remarking, "It is not our boy." The mother proceeded to examine the clothing, as the mangled body could serve no purpose of identification, only the trunk being before her, the rest of the body some distance away. She turned up the shirt, and on looking over it found traces of her needle where she had been mending it the night before, and could only exclaim, "This is my poor boy! This is my poor boy!"

Although a few others hardly bore a trace of human semblance, yet they were "Those whom somebody loved," and though seen in their deformed state, and in that horrid place, were still dear to

their friends, and thankfully received. The widowed wife and childless mother knew the remains of her offspring or husband, no matter how deformed, and no earthly power could separate her from the loving form of her tender boy or kind husband until the strength of her frail body succumbed to the superior force of her grief, and she was carried off in the same direction as the remains of her loved one.

It was a sad sight at one time to see over twenty bodies stretched on the benches and several others in pieces, and around them frantic women and weeping friends in search of those they loved. Frail women wept without restraint; strong men sobbed and broke down. Others, too frenzied to allow vent to nature, stood amazed and apalled, and silent and passive amid the scene. Some who had seldom grieved before, inspired a sigh and felt sensations as the mangled form of some pleasing associate was unveiled before their eyes. All felt that one of the saddest calamities ever realized by man on earth had fallen like a thunderbolt upon the peaceful inhabitants of Springhill, and in the dark but peaceful picture, there was only one back ground of consolation — *submission to the Divine will.*

Among those who mourned thus for their departed ones, many felt that God was near, and,

CHAPTER VII.

The Gloom Deepens.

After the first shock of the terrible calamity had passed over, and it was possible to get reliable information, the people began to realize the enormity of the disaster. As the death list from the pit swelled, and as one body after another was taken from the morgue to its former residence, or its last resting place, the gloom began to deepen. Two car-loads of coffins, manufactured by Christie Bros., of Amherst, having arrived on Monday evening, and distributed throughout the town, besides those made by the undertakers of the place, it was

A Sad Sight

to see two or three of these coffins enter the doors of several dwellings within a short distance of each other.

The houses where the dead were laid were brightly lighted up during the solemn hours of the night, and because man having gone to his long home "the mourners go about the streets," and from house to house during the night. In many cases moans, sobs and bitter wailings within those

bereaved homes told too plainly the sad story of desolation and death. One of the saddest cases of the accident was that of Fred Carmichael's family. Three brothers of this household were killed in the mine, and one was carried home unconscious, being injured by the after-damp. The affliction in this family is very great, and the sorrow is intensified by the fact that another son in the same family was killed by lightning three years ago, and Mr. Carmichael got his left arm and collar-bone broken a short time before the explosion. In this case, although the experience of good old Jacob was realized, when he said: "Me have ye bereaved of my children: Joseph is not, and Simeon is not, and ye will take Benjamin away: all these things are against me," or that of Job when he uttered his plaintive wail: "Oh that it were with me as in months past * * when the Almighty was with me, when my children were about me;" yet Mr. Carmichael was amazingly resigned to the Divine will, and could say, "God lives, bless'd be my Rock." One who was endeavoring to comfort the bereaved in their affliction, records his experience of this trial thus: "When his three boys were brought home he showed more Christian fortitude than any other that I visited. The power to control

himself was amazing, and the perfect resignation to the Divine will was a lesson I can never forget."

A Mysterious Case of Trial

was also experienced by Oliver Dupee. While this broken-hearted father was conveying home the body of his son Joseph from the morgue, another child, four years old, ran out to meet him. The boy slipped on the ice, falling on his head, and was instantly killed.

Hour by hour, as time wore on, the scene of sorrow became more desolate. As bodies were taken to be interred a mournful dirge was tolled.

The body of Manager Swift remained in the pit, and his death was peculiarly sad. Manager Conway had become prostrate owing to over-exertion in the mine attempting to free the imprisoned bodies. The lives of Mrs. Swift and a number of other broken hearted widows and bereaved mothers were being despaired of.

The mother of one large family of children left in destitute circumstances had become demented. Another widow with three children was entirely bereft of all her friends. James D. McDonald, one of the injured, was suffering from a bad dose of after-damp and nervous shock. His mind had become deranged and he could not be comforted.

The households of John Nairn, Reid Carter, Richard Dawson, Hugh Bunt, Neil Ross, Robert McVey, Jesse Armishaw and several others, were shrouded in the deepest gloom, two and three of each family having been killed.

THE SAD AND SOLEMN EXPERIENCE

of those two hundred and thirty-four orphans, widows and widowed mothers, during the few days after the explosion, must long remain "upon the tablets of enduring memory." Oh, how the hearts went down into that lonely pit which was the scene of all their woe! Those nights were full of tears; the agony of many hearts was only known to God! Those ministers of consolation who endeavored to sympathize and alleviate the trials of bereaved and stricken ones, faintly realized how deeply the arrow had pierced, and how the soul was riven, but there were none who knew it all. *To God's eye, and that alone*, was the grief revealed, and in His bottle were the tears preserved.

Amid the darkness of such a scene it was comforting to know that some of those stricken ones, in the spirit of resignation, could say, "The Lord gave, and the Lord hath taken away; blessed be the name of the Lord."

CHAPTER VIII.

Personal Incidents.

Many and varied were the personal incidents in connection with the great disaster. These incidents, as told by various persons who escaped with their lives and a number of the rescue parties, are given that the reader might have a record of important events not mentioned in other chapters.

One man who escaped states that he saw two lads fall as they were running towards the entrance. He stopped to help them, but the damp came so nearly overcoming him that he was compelled to hurry on and leave them to their sad fate.

The searching party that recovered the body of Manager Swift are confident he rose to his feet after the explosion and was knocked down by the falling stone beneath which he was covered. It is supposed that at the time of the disaster, the late manager, as he was wont to do, was leaning with his back against a box, conversing with the two miners at the face of the level. When found his head was towards the bottom of the pit and about a foot of stone was under him, which is considered

proof that he had sprung to his feet after the explosion and was making his way out. But he got only ten feet from the face, when knocked down either by after-damp or falling rock. His nose was slightly burned, but the body was not disfigured in any other way. To one of the shiftmen Mr. Swift announced his intention of going to the bank at noon, but on reaching the pit bottom he found that timber was being lowered, and started into the face of the level. He was a fast walker, and, even allowing for this, he had barely time to reach the point where his body was found. It is singular, however, that the searching party that proved successful, after consultation among the men, decided to make the attempt, though many tried to dissuade them, and were convinced that Mr. Swift could not have got so far into the level; but the little party could not be swerved, and their theory proved correct.

A Very Sad Case

was experienced by a young man whose brother was killed in the mine. He started to take the body to Cape Breton. The poor fellow, when about half way on his journey, was so overcome by grief that he became demented, and another friend had to follow to Antigonish to take him home.

Several miners who escaped say that they never heard such cries as those which came from some of the men affected by the after-damp, who realized that they must lie down and die.

One of the searching party in passing through stepped on a man's back. It was the only part visible, the head and limbs being covered with stones and fallen beams, and it took considerable time to remove these.

Malcolm Blue, another of the rescuers, in one place, whilst crawling on his hands and knees near the face of the level, put his hand on the face of the dead body of William Hyde. It was unexpected, and he drew back with a shiver.

Among the victims was Joseph Tattersall, the well known cricketer who came out from England to coach the Wanderers' Club of Halifax. He came to the mines to work during the winter. A few weeks ago he sent his wife home.

A. J. McKay, one of the killed, had only been working in the mines three days. Another of the unfortunates had made up his mind to go out of the company's employ and he would have left within a month.

A number escaped by not going into the mines that fatal afternoon. Those who worked in their

part of the pit were brought out dead on the following morning.

George Allison, Adam Larrimor, and six or seven others, had a wonderful escape. They had been working in the mines an hour previous to the explosion, but were sent out for loading bad coal. Larrimor was in the terrible Drummond explosion some time ago, and was rescued by Timothy Leadbeater, together with a number of others.

The absence of Overman Reese from No. 1 Slope at the time of explosion was evidently providential. Having been appointed to assist in the mine for a short time that day in the absence of some of those who had gone to Maccan, he was looked for but could not be found, being off duty at the time, and having taken a stroll down the Railway towards Parrsboro for some distance. On his return he was advised of the matter, and at once started to enter No. 2 Slope, and had only reached the surface when the first miner who had escaped came rushing out.

CHAPTER IX.

Experience of Survivors.

Almost every one who escaped from the mine experienced something remarkable. These experiences are worthy of record, as they form a picture of the sad scene in its various features.

One man, who fell as though dead on reaching the surface, states that he never experienced anything like the feeling he had when the after-damp began to overtake him. Despite all efforts to keep them open, his eyes closed, his joints began to stiffen, and he felt as if he must go to sleep. Many others were similarly affected. Two miners, whose eyes were bloodshot, and faces bruised by their falling on them, heard nothing, felt nothing, and said nothing until they were revived some time after being brought to the surface. Another, who was unconscious, states that he knew nothing that happened before he dropped as if dead. One who got safely out tells with a shudder the sensations of his experience. The damp, he says, poured in his ears and down his throat, and almost suffocated him. Whilst running for his life in the darkness of the mine, as every lamp had gone out, he heard men

shrieking and falling behind him. Some who paused in their flight to help along a comrade fell unconscious as if in a swoon. One strange experience was that of

CYRUS MUNROE.

He and his butty, James Morrison, and their loader, J. D. McDonald, were working in a part of No. 2 Slope. On hearing the report, the question arose as to what it was. Morrison said that it was either a fall or an explosion. All being deeply impressed that it was the latter, they caught up their dinner-cans and started to escape from the mine. When they got a short distance they were met by what seemed to be a thick fog. Munroe attempted to change his course, found his lamp going out, and felt a sweetish taste in his mouth. This is the last he remembered. When he recovered consciousness, some hours after, he realized that he was in a house near the entrance of the West Slope. Morrison was found dead, and McDonald's deplorable situation is referred to in the chapter relating to "Care of the Wounded."

ALEXANDER BLUE

was probably nearer the scene of the explosion than any other who escaped. His experience is very remarkable. As soon as he heard the first sound he

knew what it was, and jumped to the low side of t
place where he was working, and squeezed in
tween the timber props. The blast came like
lightning flash, and, in passing, caught his safe
lamp, which projected outward from his hand, a
carried it away as if in the bore of a mighty canno
The instant it passed, young Blue, being unhu
took from his pocket some cotton waste and dipp
it in some water that was under his feet, and stuff
his mouth full. This he intended to act as a filt
as well as to prevent him from inhaling large qua
tities of the poisonous gas. Being a robust you
man, who had grown up in the mine from childhoo
he knew every inch of the way as well in the da
as with a light. He started to run with all h
might, and never stopped until he reached the su
face. A large number of men were found de
along the whole course he had run.

Patrick Hennessy, Edward Chandler and Hen
Nash were all together at time of explosion.
first sound Chandler and Hennessy jumped to t
low side of the shute in which they were workin
drawing their coats over their heads and putti
their arms over their faces. They both escape
and Nash, who was only six feet from Hennes
being out in the chamber unprotected, was burn

so badly that he died on the fourth day, as recorded in Chapter V.

John Conway, who is also referred to in the same chapter, was sitting on the edge of the front box of a rake driving his horse in the level 2,000 feet from the slope bottom at time of explosion. The horse was severely burned, and killed, falling on top of the boy in some way so as not to injure him, and at the same time save him from the flame. This boy was found by some of the rescue parties after they thought the living had all been rescued. These parties were attracted by the cry of "Mother! Mother!! Mother!!!" in a low, feeble tone coming from a distance along the level, and rushing to the place whence it came, listened and heard a feeble cry of "Mother" coming from under a dead horse. On turning the horse over they found the boy only slightly affected by the after-damp. He was taken to the surface and soon recovered. The experience and escape from death of three other lads, John D. Beaton, Judson Farris and Dannie Robertson, were also remarkable. Beaton's fifteen year old brother, who was working in another part of the mine, and uninjured, on hearing the explosion, immediately ran to the place where he knew his younger brother was working, and found him burnt, wounded, and

his clothes on fire. After extinguishing the fire he put him on his shoulder, and would not give up his charge to any one who offered assistance until he had taken him out of the mine and laid him on a lounge in his own home.

Little Dannie Robertson, who is justly called

THE HERO BOY

of the disaster, was driving a rake of empty boxes into the level on the west side. He was sitting on front of the foremost box, when, in a moment, without any warning, he was struck by the terrific blast of fierce flame, and knocked backwards into the box. His light was put out, and the horse "Jennie," which he drove, was killed instantly. After lying in the box for a few minutes in a state of bewilderment, he was brought to a true sense of his perilous situation by crashing of timbers and the roof-falls around him. On springing from the box he discovered that his clothes were on fire, his horse dead, and he alone in the awful darkness, and the roof of the mine falling around him.

Under such circumstances, with heroic effort he threw off his burning coat and vest, and, with hands and arms painfully burned, he started to find his way out of the pit. But he had only gone a short

distance when he heard the piteous cries of little Farris, the trapper, whose life was saved by dodging under his seat, coming from a distance, and rushing to the place, and groping around in the dark, found the victim almost frightened to death. By this time Robertson's hands were so painful with the burns that he was almost delirious, and could not take hold of the boy to assist him out; but with unfailing courage he sat down, telling the lad to get on his back, which he did, and supporting him in position as best he could, ran with his precious burden until he gained the bottom of the slope, and leaving the lad at this place of safety, he inquired after the safety of his brother John, and was about to return into the level to search for him when some of the rescue parties caught him, placed him in a box with other wounded, and had him taken to the pit head without delay, where his brother was awaiting him. On their way home, little Dannie requested the man who took him home on a sled that he be allowed to walk into the house alone, so that his mother might not be alarmed. He is a member of the "Boys' Brigade" in connection with the Presbyterian Church of Springhill, which is under the pastoral care of Rev. David Wright, whose name is mentioned in connection with the rescuing parties. As the hero-

ism of this brave boy is, perhaps, unparalleled in history, an effort should be made at once to reward his bravery in some suitable way. His portrait is given on the following page. The boy Beaton, who saved the life of his younger brother, although not a member of the "Boys' Brigade," his bravery is also worthy of public recognition. Four members of the "Boys' Brigade" at Springhill were killed in the mines. Their names are Philip and Murdoch Ross and James and David McVey.

DANNIE ROBERTSON.

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ASTOR, LENOX AND
TILDEN FOUNDATIONS.

CHAPTER X.

List of the Victims.

As the names of our loved departed ones are still dear to us, and their memories freighted with undying affection, the writer includes this chapter as a memento to relatives of those who lost their lives by the sad disaster, and a sacred record for the interest of the general public, whose sympathies have so liberally been extended to those who were so suddenly bereaved of fathers, sons, husbands, brothers, and other dear friends.

The following is a classified list of all who were killed in the mines, including the four who died of their injuries up to date of writing (May 1st, 1891), giving the number of widows, orphans, and widowed mothers left destitute by the calamity:

Married Men with Families.

NAMES.	DEPENDENTS.
John Bentliffe,	Wife and five children.
Donald Campbell,	Wife and seven children.
Reid Carter,	Wife and three children.
John Carmichael,	Wife and four children.
William Carrigan,	Wife and two children.

MARRIED MEN WITH FAMILIES.—*Continued.*

NAMES.	DEPENDENTS.
James Conway,	Wife and three children.
John Connerton,	Wife and one child.
Matthew Collins,	Wife and three children.
Richard Dawson,	Wife and six children.
Hiram Fife,	Wife and two children.
Daniel Findlayson,	Wife and three children.
Thomas Fletcher,	Wife and two children.
Peter Gallagher,	Wife and three children.
Lazarus Guthro,	Wife and four children.
John Hunter,	Wife and four children.
William Hyde,	Wife and four children.
William Kent,	Wife and six children.
Frank Letcher,	Wife and one child.
Daniel Lockhart,	Wife and two children.
James Miller, Sr.,	Wife and six children.
John Mitchell,	Wife and four children.
Ernest Mott,	Wife and two children.
James Morris,	Wife and six children.
Jeremiah Murphy,	Wife and three children.
Angus McKinnon,	Wife and eight children.
Allan McKinnon,	Wife and two children.
John J. McDonald,	Wife and four children.
Rory B. McDonald,	Wife and four children.

MARRIED MEN WITH FAMILIES.—*Continued.*

NAMES.	DEPENDENTS.
William McGilvery,	Wife and one child.
Donald McKay,	Wife and two children.
John F. McNeil,	Wife and two children.
Rory McLeod,	Wife and two children.
Norman McLeod,	Wife and one child.
Charles Nash,	Wife and one child.
Rodger Noiles,	Wife and two children.
Malcolm Nicholson,	Wife and one child.
Hugh Robertson,	Wife and four children.
Stephen Rushton,	Wife and four children.
Archibald Shipley,	Wife and six children.
James Sharples,	Wife and three children.
Robert A. Sherlock,	Wife and one child.
Henry Swift,	Wife and five children.
Joseph Tatterstal,	Wife and five children.
William H. Turner,	Wife and five children.
Alexander Vance,	Wife and four children.
Edgar Wry,	Wife and two children.
Philip B. White,	Wife and four children.
George Wood,	Wife and one child.
Thomas Wilson,	Wife and one child.
John Williams,	Wife and six children.
*Henry Nash,	Wife and one child.

*One of the injured who died.

MARRIED MEN WITH WIFE ONLY.

John Boyd,
Robert Clark,
John Francis,
John McKinnon,
William McKee,
John Nairn,
Malcolm Nairn.

YOUNG MEN WHO SUPPORTED THEIR MOTHERS.

Alonzo Budd,
Ernest Bainbridge,
Neil McLeod,
Joseph Pitt,
Bruce Ryan,
Thomas Rogers,
Henry Wry,
*Joseph Tatterstal.

YOUNG MEN WHO RESIDED WITH THEIR PARENTS, AND OTHERWISE.

Arthur Anderson,
Herbert Armishaw,
Jesse Armishaw, jr.,
William Birchell,
William Brown,
George Bond,
Andrew Bunt,
Alexander Campbell,
John D. Campbell,
Clarence Carter,
Jude Casey,
Andrew Carmichael,
William Carmichael,
John Crawford,
Samuel Dawson,
Fred. Dillon,
Samuel Furbow,
John Gillis,
Peter Hannigar,
Thomas Hallett,
John Hayden,
Samuel Legere,

*Mr. Tatterstal had a wife and five children besides his mother.

YOUNG MEN WHO RESIDE WITH THEIR PARENTS, AND OTHERWISE.—*Continued.*

Henry Livingstone,
Thomas Morrison,
William J. Maiden,
Richard Murphy,
Samuel Muckle,
John D. McEachran,
Laughlin McKinnon,
Alexander J. McKay,
Charles McNutt,
Neil McPhee,
Robert McFadden,
Henry McLeod,
Roderick C. McNeill,
James Nairn,
James Overs,
Clifford Ripley,
James Robbins,
Howard Simonds,
David Watt.

BOYS SIXTEEN YEARS OF AGE, AND UNDER.

Alexander Bunt,
Ernest Chandler,
Thomas Davis,
Joseph Dupee,
John Dunn,
Roger Ernest,
James Johnston,
George Martin,
David McVey,
James McVey,
James Pequinot,
Peter Reid,
Murdoch Ross,
Philip Ross,
Edward Smith,
Douglas Taylor.

WOUNDED WHO DIED FROM INJURIES.

Willard Carter,
Neil S. McNeill,
Joshua McNeill,
Henry Nash.

By enumerating the former list the number of orphans, widows, and widowed mothers, left destitute by the disaster, as well as the exact number of the killed, can easily be ascertained.

The number of the different religious denominations of the dead are as follows: Presbyterians, 40; Methodists, 23; Roman Catholics, 24; Baptists, 6; Episcopalians, 29; not known, 3—netting in all one hundred and twenty-five.

CHAPTER XI.

Coroner's Inquest and Verdict.

Monday evening after the explosion, the inquest commenced in Fraser's Hall before Coroner Dr. C. A. Black, of Amherst, the resident Coroner, Dr. J. W. Cove, being ineligible to act on the occasion, owing to his official position as medical adviser for the Company at the mines.

The following jurors were duly impannelled and sworn: William Hall (foreman), Daniel Ferguson, A. E. Fraser, George Watt, Daniel Coghill, Simon Fraser, Timothy Leadbeater, R. W. McDonald, Robert Gray, Charles Simpson, Richard Bennett, and Robert Scott. The jury, after viewing the remains of John Connerton, one of the victims, descended into No. 1 Slope, to investigate the scene of the disaster, at half-past seven o'clock, returning in about two hours afterwards, when the court was opened for examination of witnesses, and continued, with the exception of a short respite, until the following evening, when an adjournment was made till the 10th of March, in order to give time to

collect all the facts possible in connection with the case. After the inquest had been adjourned by the Coroner, Inspector Gilpin commenced a thorough investigation as to the system of operating the mines, cause of the explosion, etc. The chief portion of the evidence taken at this examination was presented to the jury at the Coroner's Inquest.

The investigation throughout was one of the most thorough ever made at any inquest, and all connected with the case felt that everything that could be done was done to throw light on the real cause of the explosion.

At the inquest, Robert Drummond, of Pictou, Secretary of the Miners' Union, and editor of the *Trades' Journal*, ably represented the miners, and examined witnesses on their behalf, with a view of obtaining the fullest information possible, not only for the benefit of the men, but for the satisfaction of all parties interested. Hector McInnis, of Halifax, watched proceedings on behalf of the Company, and Chief Inspector Gilpin appeared as representative of the Government.

Many and various were the evidences submitted, but, as much of the details might not prove interesting to the reader, and would, of themselves, form a large volume, only a summary of those portions

bearing most directly on the subject are given in the following part of this chapter.

Malcolm Blue was

THE FIRST WITNESS EXAMINED.

He was satisfied that the explosion had taken place in No. 7 Balance, and probably in No. 3 Bord, but did not think there was sufficient powder in the mine to cause it.

Alex. McInnis, Assistant Manager, gave his testimony before the Coroner as follows: "Passed the head of No. 7 Balance about 9.30 Saturday morning; was in there about a week ago. I was at Springhill Junction at the time of the explosion. About two o'clock, after the explosion, visited No. 6 Balance. The shot firers were instructed by the manager. Do not think the shot firers should indicate the position of shot. Mr. Swift, manager, had charge of No. 1 Slope at the time of the explosion. Could give no opinion of what caused the explosion; do not think the shot I saw last night in No. 3 Bord caused it. Do not think that even a gun shot would have communicated with the balance to have caused it. I never saw an explosion of dust. I am satisfied there was no gas in the level below. Shortly after the bord started we began to use water." Again, at

Inspector Gilpin's investigation, he was submitte
to an examination of several hours. In this exam
nation he explained the system of ventilation an
the speed at which the fan was run before and afte
the explosion; also, in reference to the condition c
the workings of the mine. He stated that when h
was in charge of No. 1 Slope a few years ago, bodie
of gas were sometimes met with. The air was teste
daily by Conway, and a water gauge was kept in th
fan house and regularly examined by the night fire
man. He knew of no lying gas in the mine. On
being examined more particularly respecting indica
tions of gas within the past year, he believed th
men under Conway did their work faithfully. Sev
eral years ago, when the water was heavy in th
mine, two large bodies of gas were met with. This
was in the second balance from the bottom. They
stopped using powder in the levels about two month
ago when he was in No. 1 Slope. No men were
burned in the vicinity of this district of the explo
sion. There was not a flaming shot since he had
been assistant manager. There was a feeder of gas
in the level ignited by an open light, but no powde
was used. Since the feeder was discovered in driv
ing the bords in No. 7 Balance, a little gas was me
occasionally, but never in large quantities. Mr

McInnis' testimony concerning the turning of the fan was corroborated by the fan man, Angus Munro.

Charles Mitchell also supported part of McInnis' evidence. Mr. Mitchell was examined at great length. He was night fireman in No. 1 Slope, and made the last examination of the fatal district of the place before the explosion Saturday morning. His report was to the effect that the pit was clear of gas. He again entered the mine after the explosion, and the atmosphere was thick with damp. Shot Firer Wilson, he said, had told him a few days before the explosion that no holes were loaded and not fired. He did not think the holes were bored too near to the rib. He had never known of a sudden outburst of gas in the mine. He did not refuse that day to fire a shot. No powder was used in No. 7 Balance on the level. He had never seen any accumulation of gas of any importance in the mine. If there had been a hole in No. 3 he would have noticed it. He had fired a shot in No. 3 Bord in No. 6 Balance when relieving Wilson two days previous to the explosion. Assistant Manager McInnis gave detailed instructions to the shot firer, then the miners take their instructions from the shot firer. He had been nearly two years employed as fireman. There was not much dust in the bords. He thought

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twice a week sufficient to fire the bords, and that was the practice. Gas was found in small quantities in Bords Nos. 2, 5 and 7 of No. 7 Balance. The morning before the accident there was a small quantity in Bord No. 2. On one occasion he had gone in ahead of the ten o'clock shift and brushed the gas out. He was always as much afraid of the dust as of the gas in that part of the mine. The dust was very wet that Saturday morning, and could not have dried sufficiently that day to have caused the explosion. He always watered a dry place before firing a shot. It looks as if something from No. 3 Bord connected with something outside. The shot firer, Thomas Wilson, being found in No. 3 is the only reason to suppose the explosion occurred there. He did not think a blown out shot would send flame into the balance 150 feet away. The latter statement was made on examination by Mr. Drummond, and is considered important by mining men.

Dr. Hayes testified as to the cause of death in the case of John Connerton. Showed that it was attributed to after-damp.

Patrick Hennesey, who has worked as a miner in Springhill for fourteen years, testified that there was a terrible gust of wind and coal flying up the shute in which he was working when the explosion

occurred. In order to avoid it he threw himself down and placed his head against the rib. He saw the fire. It was burning around him. The fire passed rapidly; the noise was very loud. Henry Nash was seriously burned five feet from him. It passed back over them again. He stayed in the corner close to it all the time with his hands over his face. He was 250 feet up the shute. After the fire passed the air was suffocatingly hot. When he saw the blast was gone he called to the others to put their clothes over their mouths and get out. There was no gas lying at the top of No. 3 Shute. The air was good. There was a good many particles of gas in the blast. He never saw dust ignite from a shot. They always sent for the shot firer before firing a shot. He had only worked in No. 6 Balance a few shifts about three months ago. At that time there was not much dust there.

Messrs. C. Hargreaves, William Conway, William McGillvray, James Ferguson, William Murray, and others, who hold various official positions underground, were all questioned relative to the system of working, and instructions given by them to subordinates, their testimony on the whole going to show that everything was in good working order.

Mr. Conway, Underground Manager in No. 1 Slope, gave it as his opinion that the explosion took

place in No. 3 Bord, No. 7 Balance, and that it was caused by coal dust ignited by the shot fired by Wilson, which he thought must have had too much powder. He believed that coal dust would explode under certain conditions when no gas could be detected, in support of the theory that the shot in No. 3 Bord caused the explosion. He said he consulted with Manager Swift every night regarding the East Slope. Mr. Swift had never expressed fears of an accident on account of gas. Before the Workmen's Committee examined the mine, Swift had told him that "Mother Coo" had predicted there was to be an explosion in May, and he (Swift) had concluded they had better have an examination. He had talked over the question of dust several times. Swift would not admit that the dust was dangerous to a flame, but considered that the dust should be kept down for the health of the men and for safety.

Regarding the examination referred to above and its results, as well as the state of the mine, the following extract from a letter written by Mr. Conway to a friend in Ontario a few days after the explosion, and published in the *Springhill News*, gives full particulars:

"On Thursday morning, shortly after six o'clock, I met a committee of practical mining experts, each

holding Government certificates, allowing them to become underground managers in coal mines in Nova Scotia, at the bottom of the slope, 1,900 feet below the surface. These men were appointed by the Miners' Union to go down my slope, examine it thoroughly, and make a report on the condition of the mine in every respect. I asked these men what they desired — if they wished to go through the mine by themselves or would I send a good shift man with them for company. They said no, they would rather I would go with them, that they felt sure I would inform them about anything they could not understand, and would make matters plain to them. We started through the mine about seven in the morning and examined all air courses, measured the air and found 68,000 cubic feet per minute; barometer, 30° 4′ 10″; thermometer 54°. We travelled the mine all through, and got to the bottom of the slope about one p. m., where I received congratulations from these men on the

SPLENDID CONDITION OF MY MINE

and the thorough ventilation of the mine in general, old workings as well as new. They also admired my system of waterworks through Nos. 7 and 6 Balances, comprising a section of the mine about 1,000 x 600

feet, in which were many tunnels or bords, twenty three in all. In some only two men were workin and in some three men. All these men were killed and the boys and the horses that took away thei loose coal. I had waterworks through these tw balances, and every working place had a one inc tap for its own use. The men reported these fact to the Miners' Union, and left a copy of their repo in the company's office for the management. O Friday (next day), Deputy Inspector Madden wa down my mine on his monthly inspection for th Government, and had his gas indicator with hin He tested my mine all through, and only in on place found one per cent. of gas in the air, in a se tion of the mine where we used only safety lamp and excluded all blasting, loosening the coal wit mall, wedge and pick. Mr. Madden pronounce my mine the best conducted and one of the safe in the province. He left the mine at noon. O Friday evening I was appointed by Manager Swi to go to Maccan next day (Saturday) to meet th mining officials of Cumberland County, the obje being to form a society that in the near future migh have its influence felt in government circles, in legi lation for protection of mine officials. We hav none now. Mr. Swift was to take my place in th

mine. I went down at six a. m. Saturday, measured the air, and found 73,000 cubic feet per minute, barometer 30° 1′ 10″; thermometer 54°. I went to all air courses and saw everything regarding ventilation throughout the mine in splendid condition. I then visited No. 6 Balance, where I got a report from my deputy, Thomas Wilson, a sterling Scotchman, that everything in his part of the mine was in good condition and entirely free from gas. Nos. 6 and 7 Balances were in his section, and he was through them, and all of his section, when I got his report. I passed through this No. 6 Balance and gave several trifling orders. I then left the mine at 10.30 a. m. in charge of my deputies, nine in number, and with them Mr. Swift, and went home, got ready, and left Springhill Station at noon. I was at Springhill Junction only about five minutes when I was called back and told that

THE MINE HAD EXPLODED,

and men and boys were all in. A special engine ran me up to the mines. I got a lamp and called for volunteers. I got plenty to follow me, but I only took six men, and explored as far as I could. I was satisfied that all inside were dead. * * * The cause of the explosion was dust in the air from the men working, the drainage gas off the coal, and

too much powder in a blast, which made a concussion that put the air in a condition that the dust and gas ignited from the flame and smoke of the powder. The force of the flame raised the dust as it went along, and the head of the flame dried what was wet, carried it along, and converted it into flame as it travelled. We kept Nos. 6 and 7 Balances damp with water from these waterworks, which is a measure above what is required by law to do for safety in a mine, but, with all our care and caution, we had more to contend with than is generally known in the science of mining.

"I feel very much out of shape myself, although I feel that my conscience is clear from any neglect of duty. I did all that man and experience could do to have my mine in safe condition, and saw that my deputies and men under me did their duty fully. I never would allow any gas in the mine while men were working in it. If any gathered through the night I was always down the mine an hour, with a gang of men called sulphur men, before the miners and boys came down, and had the gas all blown out and the places ventilated before they went to work.

THIS WAS NEVER NEGLECTED.

Neither was any other measure of safety at any time throughout the day or night while men were work-

ing in the mine. From six a. m. until two p. m. every day I was in the mine with nine deputies and a time-keeper to look after the mine during that time. I was relieved at two p. m. by a certificated man and four deputies, and five of my deputies stopped in the mine until all the men and boys were out. At ten p. m. this certificated man and four deputies were relieved by three night watchmen, who were experts in gas, and travelled all the mine and examined every place, and had to leave their mark in chalk to show what time they had been there, and I am happy to say they never neglected their duty. It was the first thing the men looked for—this mark of the night watchman. From myself downwards, through all the deputies, we had to write reports of our doings through our several shifts, which were sent to the general office for inspection and comment. I myself had also to write a report similar to the one in the general office, which went to the head office in Montreal daily. So you can judge from this what care must be taken of the works all through its management. Presumably there will be such terrible disasters as this as long as there is mining, as there are drownings while men go to sea in ships, but we must have coal and we must have fish."

At the inquest Inspector Gilpin was examined at length. He believed there were occasional cases where coal dust alone has been known to explode, but not in this country. He would prefer to say that under ordinary circumstances there must be more or less gas present to cause dust to explode. If there is an inflammable dust the heat would drive off the gas from the dust. He also pointed out that this explosion was most singular. It occurred about midday, which is something unusual in the history of colliery explosions, as they often occur early in the morning when work begins or when a shift is being relieved. In this case it happened immediately after the dinner hour. He also expressed an opinion that it might have been caused by an accumulation or outburst of gas that may have taken place during the time the men were eating their dinner.

The evidence having been all submitted, the jury retired at five o'clock Wednesday evening, 11th March, and remained out about three hours. After the evidence had been read over and considered, the foreman, William Hall, read the following

VERDICT:

"The jury do say, upon their oath, that the late John Connerton and others came to their death by

an explosion which originated in No. 3 Bord of No. 7 Balance, in the west side of the East Slope, on the 21st February, 1891; they further believe said explosion was caused by the flame from a shot fired in said bord igniting the coal dust and a certain portion of the gas which might have been present at the time; they also believe that there was an unusual flame from said shot, owing to a slip in the stone; they believe the explosion was accidental, that no blame is attached to the management, and that they have taken every precaution for the safety of their workmen.

"The jurors make the following recommendations: First, that in future, where safety lamps are used, and in very dusty places, powder should not be allowed; second, they recommend that in gaseous portions of the mine, before the men resume work after dinner, the places should be examined by competent officials; third, they recommend the procurement, for the use of the Deputy Inspector of Mines, of a Shaw machine for testing gas."

Among the workmen this verdict was favorably commented on, and confidence in the management of the mines restored.

The state of the mine after the ruins were all cleared out was also the subject of many remarks.

Mr. Ford, Manager of the Drummond Colliery, who was at Springhill for some days, remarked that he never saw an explosion attended with so great loss of life and so little damage to the works.

A few days after the dead bodies had been all recovered the men went to work as usual. All open lights were superseded by safety lamps of the "Marsaret" and "Clanny" style, with a few "Davy" lamps for gas testing purposes. The "Marsaret" lamp is known by miners as the "boiler lamp," and is extinguished in the presence of gas in sufficient quantities to be dangerous. The dark cloud which hung like a pall over Springhill for a time, it is hoped will soon vanish, and palmy days return again to the place.

It is encouraging to know that the Company paid all expenses connected with the burial of the dead, which amounted to nearly $2,000, and also paid for all labor in connection with their recovery.

CHAPTER XII.

Burial of the Victims.

The closing scenes of this sad disaster were too impressive ever to be forgotten by those who witnessed them.

However dear the dead body of our loved one may be to us, the time comes when it *must* be laid away in the silent tomb to sleep in kindred dust until the resurrection morn, when God shall collect the elements and fashion it for the immortal life.

Public arrangements having been made for burial of the dead, in order that stricken families might in some measure be relieved from care, the funerals commenced on Monday afternoon at two o'clock, and continued daily until Friday afternoon, when the body of Manager Swift was interred.

All flags throughout the town were at half-mast, and in many cases large processions accompanied the remains of the dead to their last resting place.

When the hour had arrived for a certain number of funerals to take place, the corpses were taken to the churches, according to pre-arrangement, and after brief services had been held, they were conveyed to the various places of burial and interred.

The Baptist, Methodist and Presbyterian Ministers agreed to work together, and the bodies belonging to these denominations were taken to the Methodist Church, as it was easy of access, being situated on the main street.

The Episcopalians were taken to the Church of England House of Worship, and the Catholics to the Roman Catholic Chapel; and funeral services conducted in each place by the respective Clergy of each denomination in harmony with their modes of burial.

A number of funerals were also conducted by the different societies to which some of the dead formerly belonged.

Committees and sub-committees were appointed to look after grave digging and the funerals. In the cemetery large crowds of volunteers were employed some days digging the graves. Owing to the frosty hardness of the ground, and the extreme cold that prevailed, grave digging was a difficult matter. A large fire was kindled in the vicinity, and refreshments and hot coffee were liberally provided to refresh and warm the workers. When two or three of one family were to be buried in the same lot, a large grave was dug and the bodies laid side by side. One extra large grave was dug in which the dead,

A CEMETERY SCENE.

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o had no relatives to look after them, were ied. This grave is called

"The Strangers' Grave."

The lot was provided by Manager Cowans. It n a choice portion of the cemetery, and was one the most impressive sights the writer saw in the ying ground. In this sepulchre in the strangers' a number of bodies, some of which were gar- ed in the harvest of flame, were laid away to rest the hands of strangers, after the winding sheet of w had been drawn aside and the grave dug for m. Although other sepulchres in the beautiful nd are calculated to impress the visitor, yet, ding at this grave the Christian is reminded that Redeemer was laid in a borrowed tomb. He also by faith look forward to the resurrection n and

Truth, Love and Mercy in triumph descending,
d nature all glowing in Eden's first bloom,—
the cold cheek of death smiles and roses are blending,
d beauty immortal awakes from the tomb."

Besides the strangers who are buried in this large twenty-one others, who had no relatives in inghill, were claimed by friends and taken by rail other places for burial.

When graves for a certain number were ready, a committee in charge at the cemetery, who were provided with lists of the dead, sent word to the other committee with headquarters at the Methodist Church, and the bodies were at once sent down on sleds and interred. In some cases a dozen or more bodies were sent down at the same time, and two or three coffins on one sled, sorrowing friends following in procession to see the remains of their dear ones laid away in the silent tomb.

The cemetery is situated on the Salt Springs Road, at the base of the hill, eastern side of the town. It is one mile from the Methodist Church, and is known as Hillside Cemetery.

During the days in which the funerals continued business places were closed, and the whole place was shrouded in the deepest sorrow.

A number of outside ministers assisted the resident clergy in conducting the funeral services, and ministering consolation to the bereaved. Revs.-Father Egan, of the Catholic Church, was assisted by Fathers Cummane, of Truro, and Walsh, of Londonderry. The Episcopal Rector, W. C. Wilson was aided by Rural Dean J. Roy Campbell, of Dorchester, and Revs. C. E. McKenzie, Rector of Shediac J. L. Downing, R[illegible] of River John, and Simo

On hearing of the explosion, Rector Gibbons hurried to the parish and worked five days, assisting in ministering comfort to the living, and in burying the dead. Dean Campbell's ripe sympathy contributed much comfort to the distressed. Rector Mackenzie was a former Rector of the Parish, and came to perform the last solemn rites over many of his former parishioners. Rector Downing came to look after some of his congregation who were killed in the disaster.

At the Methodist Church, Revs. D. Wright, D. W. Johnson, and H. B. Smith attended. Rev. J. M. Robinson, of Moncton, and Revs. John Craig, of Southampton, and Thomas Evans, of Oxford, visited the afflicted households, and also assisted at some of the funerals. The arrangement was that one of the clergy should always be at the church, one at the cemetery, and another accompanying the funerals to the grave, each taking his turn alternately. It was at these funeral services in the Methodist Church that the most

HEART-RENDING SCENES

were witnessed. The greater number of the dead were taken from this place for interment. Here weeping friends assembled to mingle in the services. The long rows of coffins visible were too much for

frail nature to bear. At times it appeared as it there were no oasis in the dark wilderness. Many of the bereaved here "mourned with a great and very sore lamentation." Ministers tried to read portions of scripture, offer prayer, and speak words of comfort to the distressed, but were often overcome by their feelings, so that they could only mingle their tears with the congregation. One who took an active part in these services, in a communication to the writer, states: "The words seemed to come back upon myself. Words were wholly inadequate to express either what minister or people felt. The feeling was what *can* we say, or what *shall* we say that will be most appropriate. It was a time when the heart felt, but found no channel through which it might or could express itself. To look on was worse than taking a part. To look was to shiver and feel sick; to turn and help was the only way to escape a sickening feeling creep over you."

At the Episcopal Church some of the scenes were also very sad. Of the twenty-nine who belonged to this denomination two were taken away by train, two were buried at Windham Hill, and the twenty-five buried in the Springhill Cemetery were all taken to the church, with the exception of one lad, who was buried as a stranger, his own father not being

able at the time to recognize what remained of a dear son. The remains of this boy were exhumed afterwards, and placed in the family lot with full funeral obsequies and service. At one time seven caskets were in this church, and in three sad instances these funerals took place from each of the three households. In addition to the burial services held in this church, a memorial service was held on the second Sabbath after the explosion, and the offertory, which was a liberal one, is to be devoted to the erection of a brass Memorial Tablet in the proposed new Church of England, which is soon to be erected. This tablet will contain the names of the church members who were killed. It is expected that the new church will in many respects be a "memorial" church, as several parts of the structure and of the furniture will be given as memorials. Special contributions from church people in all directions have been asked for this object.

Some of the funerals were of a public nature, the processions accompanied by bands of music and other demonstrations of honor for the dead, and general sympathy for the friends bereaved.

One Particularly Painful Funeral

took place. The remains of John Hunter were recovered late in the evening, and it was absolutely

necessary to inter the body at once. Rev. Dean Campbell read a brief service at the church, and Rector Wilson met the body at the cemetery. The darkness had set in, the diggers had left for the night, and it took some time to get the grave ready. Two faithful persons stood by the casket, and by the glimmering light of the lanterns the service was read and the body laid in its narrow house a short time before the hour of midnight.

The Funeral of Manager Swift

was the last funeral of those who were killed in the mines. It took place on the afternoon of Friday, and was public in its nature. After brief services had been conducted at the late residence of the deceased by his pastor, Rev. D. Wright, and Rev. J. M. Robinson, pastor of the Presbyterian Church at Moncton, the remains were taken charge of by the Freemasons and buried with the rites of the Masonic Order. Besides members of the Order in Springhill many were present from other places. The procession was headed by the band of the 93rd Battalion, accompanied by the Cumberland Cornet Band. The procession was fully three-quarters of a mile long, and the route was lined by crowds who silently wept as the cortege passed, and many of whom followed

the remains to the cemetery. The band played a mournful dirge. At the grave the services were conducted by Revs. J. M. Robinson, S. Gibbons, and D. Wright, and were most impressive. The circumstances of the case were calculated to make a deep and lasting impression. The shroud of snow now stained by the new made graves, the wind moaning through the leafless branches of surrounding trees, the sad strains of the funeral dirge, sobbing of bereaved spectators, and the solemn hush felt by all in the presence of death, formed the last sad scene of the great calamity which had filled the town with the deepest gloom for a whole week.

In connection with this last funeral it may be stated that

THE LATE HENRY SWIFT,

Underground Manager of the Springhill Collieries, took a deep interest in the welfare of the men over which he was placed as Overseer. Being a self-made man, and having a thorough understanding of coal mining operations, he was naturally looked upon as a leader among his companions. He was an Englishman by birth, born at Beckerstaff, Lancashire, in 1850. When twelve years of age he went to work in one of the mines of the Ramford Coal Company, who operated several collieries in Lanca-

shire, which were held under lease from Lord Derby, father of Lord Stanley, Governor-General of Canada.

Mr. Swift worked at coal mining in England with much success, until nineteen years of age, when he emigrated to the United States. After spending a short time in some of the Anthracite Mines of Pennsylvania, he removed to Maryland and thence to Nova Scotia, working in the Albion Mines until 1874, when he came to Springhill and persevered in his regular calling until the terrible disaster, when he lost his life in the faithful discharge of his duties.

At the Albion Mines Mr. Swift was married, in 1871, to Miss McLeod, who, with five children, survives him. He was appointed Underground Manager of the Springhill Collieries, under Mr. Hall, whom he succeeded, in April, 1890. Mr. Swift was an active member of the Presbyterian Church. He was also a member of the Masonic Order, a Justice of the Peace, Vice-President of the Nova Scotia Institute of Mining Officials, and President of the Relief Fund for the benefit of sick and injured miners. He was a hard worker, close student; a man of broad sympathies, a warm-hearted friend, a kind husband, tender father; and in his death his family are not only left to mourn, but the community has sustained an irreparable loss.

HENRY SWIFT,
Late Underground Manager Springhill Collieries.

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CHAPTER XIII.

Sympathy with the Bereaved.

The following day after the explosion a meeting of the leading citizens, representative miners, town council and clergy of Springhill was held to consider what should be done under the circumstances. At this meeting it was decided that an appeal for aid to assist the sufferers should be wired at once to the leading cities in various parts of the land. The appeal was transmitted free of charge by the telegraph companies to the principal cities in Canada, the United States, and Great Britain. The following is a copy of the urgent appeal made to the public:

"Springhill, N. S., Feb. 22nd, 1891.

"A mining disaster attended with fatal results, unparalleled in the history of Canadian miners, has fallen upon the town and the people of Springhill. The loss of life is probably as great as the combined appalling loss at the Drummond and Ford pit explosion.

"About 117 lives are known to be lost. Fifty-one widows have been left behind, and 157 children made fatherless. The widows and fatherless will require abundant assistance, and that promptly, from a public shocked and horrified by this horrible calamity.

"Seventy thousand dollars will be required to meet the demands and to alleviate the sufferings of the bereaved and distressed during the most pressing period of their direful misfortunes.

"The residents of Springhill, in meeting assembled, have appointed a committee, consisting of the Mayor, Town Council, and all the resident clergy, to solicit and acknowledge subscriptions to the Springhill Relief Fund, and they confidently and earnestly ask for an immediate response of all denominations, societies, guilds and nationalities.

"WM. HALL, *Mayor.*
"A. MCLEOD, *Secretary.*"

This appeal was sent broadcast in the evening, and responses by telegraph expressive of sympathy, and guarantee of immediate aid were many and prompt.

On hearing the sad news, Queen Victoria cabled at once, through Lord Stanley, Governor General of Canada, to Mayor Hall the following:

"Her Majesty commands to inform you that Her Majesty has heard with much regret of the Springhill colliery disaster, and desires me to convey an expression of her sympathy with the injured, and with the relatives of those who have lost their lives. Be good enough to send details for the Queen's information."

In connection with this cablegram, the mayor also received the following telegram from the Governor General:

"OTTAWA, 23rd February.

"To Mayor Hall: I am deeply grieved to learn how serious the accident at Springhill has proved. Pray express, if possible, my sincere sympathy with the relatives of those who have been lost. I shall be glad to hear how the injured are progressing.

"(Signed). STANLEY OF PRESTON."

The following is a copy of Mayor Hall's telegram in reply:

"SPRINGHILL MINES, N. S., February 23.

"*Lord Stanley of Preston, Ottawa:*

"Her Majesty's devoted subjects are deeply grateful for her gracious expression of sympathy in their sore affliction. Please transmit to the Queen our warmest thanks.

"Henry Nash, one of the wounded, died last night. The recovery of others is doubtful. Most of those brought out of the pits, unconscious from the effects of after-damp, have rallied. The number of wounded now living is about ten. The deaths caused by the explosion number one hundred and twenty-two.

"Accept our grateful thanks for your own remembrances.

"WILLIAM HALL, *Mayor.*"

The Queen donated a handsome cheque, and Lord Stanley advised a draft of five hundred dollars.

Other donations, averaging from fifty to one thousand dollars each, were wired at once from various sections. Public meetings were held immediately in many cities and towns of Canada; subscription lists were opened; city councils donated; churches, societies and individuals contributed without delay, and in two months after the disaster the contributions had netted nearly

ONE HUNDRED THOUSAND DOLLARS.

The following press extracts, which have come under the writer's notice, will give some idea of the promptness of response to the call for aid:

"MONTREAL, Feb. 24.—A meeting of influential citizens was held in the Board of Trade rooms to-day for the purpose of forming a relief fund in aid of the sufferers by the Springhill mine disaster. The president of the Board of Trade presided, and earnestly invited the citizens to respond liberally to the appeal for funds. Hon. George Drummond and others spoke. A committee consisting of the wealthiest citizens of Montreal was appointed to wait upon the finance committee of the city council and ask them to head the list. Several large sums

have already been promised, and Montreal may be expected to subscribe liberally to aid its suffering brethren in a sister province. Subscription lists are to be opened through the city and an appeal made to the churches of all denominations."

"MONCTON, Feb. 22.—The disaster at Springhill excites universal sympathy here. Mr. Whitney, mechanical superintendent of the railway, has telegraphed fifty dollars. Mayor Sumner has also telegraphed sympathy, and a public meeting will be held to consider the matter of financial assistance. Reference was made to the disaster in all churches to-day.

"The Governor General has already sent a contribution, through the Bank of British North America, for five hundred dollars, the town of Moncton telegraphs one thousand dollars, and John McDougall & Son, of Montreal, have subscribed a thousand to-day."

"YARMOUTH, N. S., Feb. 24.—At a very large and influential meeting of citizens in the court house this evening, the following resolutions were unanimously adopted:

"That Mayor Leavitt be authorized to convey to the mayor and citizens of Springhill an expression of the sincere regret of the people of Yarmouth on account of

the awful calamity that has befallen that town, and th
has deeply stirred our citizens of all classes and creed
and prompts this assurance of heartfelt sympathy with t
sufferers in their distress and painful bereavement.

"It was also resolved that, in the opinion of th
meeting, the town council of Yarmouth be authorized
pay to the Springhill relief fund the sum of $1,000, and
assess that sum off the ratepayers of this town.

"The money will be wired in the morning."

"SPRINGHILL, Feb. 24.—Telegrams are pourin
in from all quarters. The relief fund now amoun
to $3,300. Sympathetic telegrams have been r
ceived from Archbishop O'Brien and the Mayors
St. John, Moncton, Halifax, Brandon, Cobour
Sherbrooke, Hamilton, Amherst, Lunenburg, Par
boro, Little Glace Bay, and North Sydney, prom
ing prompt contributions to the funds."

"HALIFAX, Feb. 24.—Mayor McPherson
ceived a cable from London, this morning, fr
Mr. William Miller, of Murdoch's Nephews, stat
that he and his brother would subscribe $1,000
the Springhill relief fund, which would be p
through Murdoch's Nephews, of this city."

"TORONTO, Feb. 27.—The executive committ
of the city council have decided to recommend
grant of $2,000 to aid in relieving sufferers by t
Springhill horror.

"Grand Master Robertson, on behalf of the Masonic Grand Lodge of Canada, has forwarded $250 to the fund for the relief of the sufferers by the disaster."

"BELLEVILLE, ONT., Feb. 27.—The city council, this afternoon, voted $200 to the fund for the relief of sufferers by the Springhill disaster."

"OTTAWA, Feb. 27.—Subscriptions are being taken up here for the relief of the Springhill sufferers."

"SPRINGHILL, Feb. 24.—Rev. Mr. Johnson received to-day, from an anonymous contributor, a letter without a date inclosing $25, and referring him to St. Matthew's gospel, chap. vi., verse 1, also expressing gratitude for past mercies bestowed upon the writer. Mayor Jones, of Parrsboro, arrived here to-day with $1,000, which, considering the size of the town, is a magnificent contribution. He says this sum will be supplemented by another contribution. The response is prompt and hearty, but only those on the spot have the slightest conception of the great necessity. Cases of extreme destitution are everywhere apparent, and the appeal should have been for a larger sum."

"ST. JOHN, N. B., February 26.—A public meeting of the citizens was held at City Hall yesterday in

response to a call from Mayor Lockhart, George Robertson, Gilbert Murdoch, C. W. Weldon, Q. C., Geo. F. Smith, E. McLeod, Q. C., John McMillan, Ald. Shaw, Ald. Robertson, Ald. Lewis, Ald. Busby, Ald. Peters, D. Patton, Senator Dever, Rev. Canon Brigstocke, Rev. George Bruce, Rev. Dr. Macrae, Rev. T. F. Fotheringham, James Manchester, S. D. Scott, W. W. Turnbull, R. C. Skinner, W. E. Vroom, F. W. Hatheway, J. deWolfe Spurr, Sir Leonard Tilley, R. B. Emerson, C. A. Everett, Simeon Jones and R. P. Starr.

"In calling the meeting to order, Mayor Lockhart referred in feeling terms to the disaster at Springhill, which had brought sorrow to so many homes, and left so many widows and orphans to be provided for at the hands of a charitable people.

"Sir Leonard Tilley, R. P. Starr, W. E. Vroom and R. C. Skinner spoke of the necessity for aid, an some of them were of the opinion that the Comm Council should make an immediate grant of $2,50

"Sir Leonard Tilley advocated that the money be sent forward should be raised by voluntary su scription. Sir Leonard said the officers of the Pr testant Orphan Asylum had offered to provide for number of the children, and this was a most generou and Christian-like act.

"C. W. Weldon, Q. C., thought it would be well to request the Common Council to make a liberal appropriation and also open a voluntary subscription.

"Daniel Patton moved the following resolution:

"*Whereas*, The recent calamity in the Springhill mines has caused the loss of many lives, with the sad result that the widows and children of those who lost their lives are now destitute;

"*Therefore resolved*, That the citizens of St. John most sincerely sympathize with the bereaved and desire to aid those who are in want; also

"*Resolved*, That the Common Council be requested to make a liberal appropriation to the Mayor of Springhill and that a private subscription list be opened.

"The resolution was seconded by John McMillan.

"Rev. Canon Brigstocke heartily agreed with the spirit of the resolution, and hoped the council would be able to make the subscription a large one. The calamity was a dreadful one, and the people of Springhill responded promptly when St. John was in need. The St. John fire was not to be compared with the mining disaster in point of the loss of life resulting. He thought all the churches and societies and Christian organizations should lend a helping hand in this case and take up subscriptions.

"Mr. John McMillan reminded those present

that after the great fire in St. John the citizens of Springhill, then numbering between 1,500 and 2,00[illegible]0, forwarded $218 to St. John. In view of this he fe[illegible]lt sure that every taxpayer in St. John would feel th[illegible]at he would like to give something, even if it were b[illegible]t little, to relieve the widows and orphans at Sprin[illegible]g-hill. He thought the relief fund should take th[illegible]e form of a civic gift.

"Mr. W. E. Vroom stated that he had wire[illegible]d R. H. Cooper, the treasurer at Springhill, and ha[illegible]d been informed that Mayor Hall and the clergy o[illegible]f Springhill, together with the committee of the Em[illegible]- ployees' Relief Fund Association, and Mr. McLeo[illegible]d of the company's office, had the matter of handlin[illegible]g the funds in charge. The matter could not, he felt[illegible] be in better hands. They thought $70,000 would be required to relieve the distress. Probably forty-five out of the fifty-four widows were in debt at the stores on account of the late strike. There were more than one hundred and sixty orphans, and all were dependent upon the miners, who were now able to do little for them. All disposed to contribute could be certain that the very best possible disposition would be made of the funds.

"Sir Leonard Tilley held that there could be no difference of opinion in regard to the wisdom with

which the money would be distributed. The generosity and universality of the subscription to the Fred. Young Memorial had been marked, and he felt that the citizens would subscribe liberally in the present instance. The easiest way would be to have the council dispose of the matter, but he thought the effect would be better if the money were raised by voluntary contributions from those whose hearts had been touched.

"Mr. Starr said that he was intimately acquainted with the committee at Springhill, and assured the meeting that the matter could not be in better hands.

"Alderman Lewis moved that a committee of five, of which the mayor shall be chairman, be appointed, with power to add to their number, to take charge of subscriptions. Carried.

"On motion of John McMillan a subscription list was opened in the meeting, and nearly $1,000 were subscribed at once by those present.

"St. John, February 26. — At the weekly meeting of St. David's Church, last evening, the Rev. Geo. Bruce brought up the subject of the Springhill colliery disaster, and at the suggestion of Senator Boyd (who referred to the noble action of the Protestant Orphan Asylum Board), seconded by Mr. Robert Cruikshank, President of the Joggins Coal

Mining Association, who gave a most interesting account from his own experience of the danger of coal mining, the vote was taken to which there was a unanimous response; and so St. David's collection at both services Sunday will be in aid of the fund.

"At the morning service in St. David's Church, Rev. George Bruce preached from John xvii. 21: "That they all may be one." Never did he speak with more fervor, and his description of the morning parting at his home with wife and children, as the miner went to his work, and the unknown death awaiting him there, was most powerful. His references to the humanizing influences of suffering, and the cablegram from our good Queen, whose widowed heart, yet bearing the great sorrow of her bereavement, was evidence of this. From every part of this great British empire the help notes were heard; from the humblest subject to the Governor General here, and from the Queen to the ruled there, but one sentiment prevailed, which showed that we are all one. The collection will be over $200. Many have given in other ways."

These extracts are given as a mere sample of how the hearts of all classes and communities were touched on hearing the news of the terrible calamity.

In reference to the church responses, ministers of all denominations throughout the land brought the

matter before their congregations in a forcible and impressive manner.

The following outline of sermon, preached on behalf of the Springhill sufferers by the Rev. A. J. McFarland, of St. John, N. B., March 8th, 1891, which the writer had the privilege of listening to, is given as a specimen of the discourses delivered in many places on the occasion:

Text: Luke x. 29–37. Theme: "Our Neighbors, the Springhill Sufferers."

From this parable we may learn what was Christ's conception of neighborhood. The lawyer having been convicted of great failure in the light of his own law, hopes to find excuse and justification in the answer to his question, "And who is my neighbor."

Jesus in this parable presents a case and submits it to the lawyer to decide who acted the neighborly part. As the case was presented there was only one answer; of the three—the Priest, the Levite and the good Samaritan—the latter alone "shewed mercy" to the robbed, wounded and half-dead man on the highway. Our Lord cuts short the interview with the cavilling lawyer, by saying, "Go, and do thou likewise."

Compared with the conception of Christ as exhibited here, the prevailing opinion of the world is often narrow and selfish. Many would confine their love and benefaction to their kindred, their blood relations; some would extend them to the circle of their acquaintance, their social

set; some would be willing to embrace in their view those of their fellow-citizens with whom they desire an interchange of civilities, while others would extend the limit to those of their own religion or nation, but all these views fall far inside the limit set by our Lord. His conception would—

1. Break down the unreasonable and wicked barriers of race. Christian principle and Christian spirit are in accord with the fact announced by Paul on Mar's Hill, that God had "made of one blood all nations of men to dwell on the face of the earth." The enmity cherished by strong nations and races against those who were weak has been foolish and illogical. The deep racial prejudice of our time is not natural. The Indian, the Chinaman and the Negro are in Christ's view on the same plane with the Caucasian. In Christ "there is neither Greek nor Jew, Barbarian nor Sythian, bond nor free, but Christ is all and in all."

2. It includes the whole world. Wide spaces formerly served to limit the knowledge of one part of the world concerning other remote parts. As a natural consequence, cases of need excited less sympathy than they otherwise would. But science has in our day annihilated space so far as our knowledge of the world is concerned. We get the details of a disaster in the Antipodes as readily as we do when it occurs in an adjoining province. Those who lie wounded on life's highway in India or China have a

claim on our love and help, that they may be brought back to life and health and joy, as strong as those who live under the same flag with us.

3. It extends to every kind of character; not alone to the worthy and the good and the lovable, who are unfortunate, but to the ungodly, the immoral, the erring, the fallen. Christ did not take the "other side" as he passed by the publicans and sinners of his day, but he exposed himself to reproach by his readiness to mingle with them with a view to help them up to a better and purer life.

The practical conclusion, dear brethren, from this line of thought is, that this Christian conception of neighborhood clearly includes such sufferers as those who were so suddenly made widows and orphans by the terrible calamity at Springhill. Our generous sympathy and practical kindness should go out freely to these sufferers in our contributions to-day. Seek for more of that love to God whereby we may be qualified for loving all whom He loves.

On hearing that four members of the Boys' Brigade at Springhill had been killed, and another seriously wounded, the First St. John Company Boys' Brigade of Canada sent $50 for the benefit of the sufferers belonging to that corps as a fraternal gift to comrades. This being a private gift, the amount is not credited in the following chapter.

CHAPTER XIV.

Help for the Destitute.

The writer would gladly give the name in this chapter of every person who contributed of their means to the Relief Fund in aid of the orphans, widows and widowed mothers left destitute by the great calamity at Springhill, but as several volumes the size of this book would not contain a complete list of these names, were it possible to secure them all, a summary of the whole in many cases is considered most practicable. As the several amounts contributed have been duly credited in the public press, and will no doubt be published again in the Treasurer's report, it is not essential that every separate item should appear in this volume. Besides taking it for granted that many who contributed to the general fund gave in the spirit of the Master, who says: "When thou doest alms let not thy left hand know what thy right hand doeth." In personal donations the amounts are credited to the places where the donors reside instead of to the persons who gave.

The following is a carefully prepared list of contributions publicly acknowledged, as received by the Treasurer up to date of writing (May 29th), the

whole netting $86,504.42. In the arrangement of this list the aggregate amounts contributed by city corporations, citizens, committees, societies, churches and private individuals forming one community, are all included in the amount credited to each place so far as the writer has been able to collect them together:

Montreal, Q.	$ 22,435 55	Sydney, C. B.	$ 606 75
St. John, N. B.	7,639 22	Sherbrooke, Que.	532 15
London, Eng.	3,336 91	Victoria, B. C.	500 00
Moncton, N. B.	2,512 81	Vancouver, B. C.	522 00
Truro, N. S.	2,056 70	North Sydney, C. B.	500 00
Lethbridge, N. W. T.	1,627 30	New Glasgow, N. S.	500 00
Windsor, N. S.	1,431 48	Sydney Mines, C. B.	487 53
Fredericton, N. B.	1,109 00	Toronto, Ont.	1,731 61
Amherst, N. S	2,011 41	Reserve Mines, C. B.	450 00
Yarmouth, N. S.	1,100 00	Hantsport, N. S.	450 00
Londonderry, N. S.	1,000 00	Stellarton, N. S.	710 65
Parrsboro, N. S.	1,071 40	Newcastle, N. B.	410 50
Dartmouth, N. S.	975 82	Marysville, N. B.	359 60
Nanaimo, B. C.	1,147 30	Antigonish, N. S.	377 57
Pictou, N. S.	900 00	Victoria Mines, C. B.	344 00
Lunenburg, N. S.	803 00	Charlottetown, P. E. I.	1,114 05
Gowrie Mines, C. B.	769 75	Quebec	710 00
Chatham, N. B.	730 50	Brantford, Ont.	235 00
Wellington, B. C.	750 00	Dorchester, N. B.	207 00
Caledonia Mines, C. B	645 00	Wolfville, N. S.	207 00
Glace Bay Mining Co. and Employes	551 00	Kentville, N. S.	209 80
*Halifax, N. S.	3,928 30	Capelton, Que.	201 25
		New Westm'ter, B. C.	200 00

*In addition to the above amount, Halifax has donated about $12,000, which will, no doubt, be publicly acknowledged by the Treasurer when received.

Hamilton, Ont.....	$	276	00	Wallace, N. S.....	$
Belleville, Ont.....		205	00	St. Andrews, N. B....	
Brocton, Mass. (from Provincialists).....		200	00	Bridgetown, N. S.....	
Petersborough, Ont...		187	00	Shediac, N. B.....	
Bridgeport, C. B.....		175	00	Port Mulgrave, N. S.	
Lennoxville, Que.....		156	00	Bridgewater, N. S....	
Sussex, N. B.....		160	25	Lower Horton, N. S.	
Canso, N. S.....		153	90	Port Medway, N. S...	
Annapolis, N. S.....		42	50	Isaac Harbour, N. S..	
Winnipeg, Man.....		162	00	Woodstock, Ont.....	
Petitcodiac, N. B.....		138	50	Port Hope, Ont.....	
Digby, N. S.....		136	00	Stratford, Ont.....	
Great Village, N. S...		127	00	Falmouth, N. S.....	
Campbellton, N. B....		115	15	Nelson, N. B.....	
Windsor, Ont.....		330	75	Woodstock, N. B.....	
St. Hyacinthe, Que...		214	00	Springhill Jct., N. S.	
Pt. Hawkesbury, N. S		125	25	U. Musquodobit, N. S.	
Canning and Kingsport, N. S.....		114	20	Oshawa, Ont.....	
St. Stephen, N. B.....		187	47	Canard Station, N. S.	
Coaticooke, Que.....		105	00	Granville Ferry, N. S	
Guelph, Ont.....		125	00	Par. Blackville, N. B.	
Brandon, Man.....		171	15	Port Williams, N. S..	
Chatham, Ont.....		100	00	Walkerville, Ont.....	
Liverpool, N. S.....		141	00	Kingston, Ont..... ..	
Niagara Falls.....		100	00	Ingersoll, Ont.....	
Coburg, Ont.....		150	00	Hillsboro, N. B	
Port Hood, N. S.....		30	00	Sackville, N. B.....	
Lindsay, Ont.....		100	00	Westville, N. S.....	
Goderich, Ont.....		100	00	Oxford, N. S.....	
				Joggins, N. S.....	
				Economy, N. S.....	

Directors and Employes Windsor & Annapolis Railway...	$379 50
St. Andrew's Church of Scotland, Lancaster, Ont.....	37 00
General Mining Association.....	243 33
Bible Hill and Brookside	58 50
St. John Congregation, Scotsburn	44 00
Knox Church, Galt, Ontario.....	55 00
Methodist Church, River Hebert and Minudie	23 60
Pres. Church, Union Centre, Antigonish.....	22 57
Ashfield Pres. Church, Kentort, Ont.....	50 00
Laurel Lodge, I. O. G. T., Upper Stewiacke, N. S.....	30 00
Y. P. S. C. E. and other friends, Hopewell, N. S.....	65 17
Sons of Temperance, Little Glace Bay.....	10 00
St. James Church, Herring Cove.....	21 00
St. Bernard's Church, Weymouth, N. S.....	62 00
Keewatin No. 1, I. O. O. Foresters, Rat Portage.....	25 00
Acadia Village School, Horton Landing.....	15 00
St. John Presbyterian Church, Dalhousie, N. B.....	60 00
Presbyterian Church, Sheet Harbor, N. S.....	20 00
Methodist Church, Barrington, N. S.....	23 00
Milville Sewing Society, Middle Stewiacke, N. S.....	13 00
Presbyterian Church, River Stewiacke, N. S.....	15 00
St. Mary's Parish Church.....	26 36
School Children's Fund, per Inspector Lay.....	66 60
Springside Congregation, Upper Stewiacke, N. S.....	32 65
Citizens Security Investment Co.....	50 00
Union Church, Hopewell, N. S.....	10 00
Employes Albert Manufacturing Co., Hillsboro, N. B.....	182 00
Salem Presbyterian Church, River John, N. S.....	37 00
Y. P. S. C. E., Tatamagouche, N. S.....	27 95
Presbyterian Church, Onslow, N. S.....	34 30
I. O. G. T., Bass River, N. S.....	30 00
Willard D., S. of Temperance, North River, N. S.....	18 00
Methodist Church, Bedeque, P. E. I.....	65 00
General Mine Co., Salmon River, N. S.....	60 75
Presbyterian Church, Alliston, Ont.....	20 00

Presbyterian Church, Sandford, Ont.	$
South Side Ladies' Society, Middle Stewiacke, N. S.	
Miners and Mine Laborers Association	7
Trenton D., S. of Temperance, N. S.	
Methodist Church, Port Perry, Ont.	
Sorcom Lodge, No. 66, Whycocomagh, C. B.	
Enfield Division, Pictou Co., N. S.	
St. Patrick's Society, Richmond, Que.	
Pioneer Grange, and Good Templars, Kings Co., N. S.	
Broadway United Presbyterian Church, Broadway, R. I.	1
Petite River, Lunenburg Co., N. S.	
Presbyterian Church, Norwood, Ont.	
Vernon, B. C., per Rev. P. F. Langille	
Portapique Congregation	
Bank of Montreal, Picton, Ont.	
Staff Com. Cable Co., Hazel Hill, N. S.	1
St. Croix Soap Company	2
West & Vale Manufacturing Co., St. Catherines, Ont.	
Rexford Manufacturing Co., Bedford, Que.	
Virgin Lodge, No. 3, A. F. & A. M.	
Matthew, vi. 1	
Grand Lodge of Canada	2
Canada Life Assurance Co.	1
Ladies Riverside Social, Middle Stewiacke	
Teachers and Students Acadia College	1
Vesper D., S. of Temperance, Hants Co.	
Seaside Division and Youths Reform Lodge, various collections in Pictou Co.	
Golden Dawn Division, Musquodobit	
Friends at Leadville, Col.	
Friends in New York	5
Friends in Lynn, Mass.	
Contributions from various places in Canada and United States	2,3

CHAPTER XV.

Lessons from the Great Calamity.

Completing the narrative of this sad disaster, in speaking of those who perished in the mines, we are compelled to say that all the homes left vacant by this calamity will have a shadow on them many years to come. As there is no earthly compensation which can meet the case, fathers, mothers, children, widows, and other friends of the departed, must weep, and the whole community feel sad and poorer on account of their loss. And, although there is apparently no silver lining to the dark cloud, or background of consolation to the sad picture, yet there is a ray of hope that, in that solemn hour in the dark recesses of the pit, although

> "No earthly friend was there to wipe
> Death's cold sweat from the brow,
> Or loving hand to close those eyes,
> Which sleep in darkness now,"

in many cases, above the awful crash of the explosion, the voice of Divine Love was heard to say: "Leave thy fatherless children, I will preserve them alive, and let thy widows trust in me."

One important lesson to be learned from this disaster is, that the

GREAT FORCES OF NATURE,

which are under the absolute control of the Almighty, have a power and sacredness about them which puny man can only realize when brought in contact with such scenes as those of this terrible calamity.

Although man is morally bound to use all lawful endeavors for the preservation of life and property, yet, in the infinite wisdom of God, for some purpose that we cannot comprehend, it is evident that he must sometimes be given to understand that, with all his boasted knowledge, and efforts to handle the lightnings, control the storms, and make other powerful elements of nature bow to his will, he requires such terrible experience as that taught by this calamity to enforce upon his mind the fact that, with all his increase of knowledge and power to do exploits and protect himself, there is no safety anywhere except in God.

It is well to study laws relating to health and preservation, employ skilled labor, guard against all recklessness and blunderings in dangerous occupations, and to know that nature is uniform in all her operations, and that the laws which govern her

economy are regular laws, which cannot be violated with impunity; but in all the advancement of art and attainment of knowledge, it *must* be admitted that there appears but little safety from sudden death or freedom from accidents.

Being, therefore, only too evident that the "silver cord" which binds our soul to its tenement of clay may be snapped asunder at any moment by accident or disease, ushering the spirit into the eternal world, why should the warning voice of this calamity not thunder in the ears of all who have heard thereof, "Prepare to meet thy God," "Be ye also ready: for in such an hour as ye think not the Son of man cometh."

Surely, amid the troubled scenes of life, and the certainty of death, there is implanted in the Christian's bosom an *assurance* of a higher life, which is free from all destructive forces, and where "there shall be no more death, neither sorrow nor crying; neither shall there be any more pain."

After surveying the wisdom and goodness of God in our past experience, and His mercy in the deliverance from eternal death, wrought out for us by His Son, should we not endeavor to trust Him fully, and devote our lives to His service, having our loins girt and our lamps burning, that when the

messenger of death comes we may be prepared to "enter in through the gates into the city" where the redeemed of earth shall endure no more pain or parting from friends, and where "the Lamb which is in the midst of the throne shall feed them, and shall lead them unto living fountains of waters, and God shall wipe away all tears from their eyes."

CHAPTER XVI.

Review of Other Great Coal Mining Disasters.

A glance at a few of the great colliery disasters which have taken place during the past eighty years will enable the reader to see that the Springhill calamity is among the greatest on record.

On the 25th of May, 1812, an explosion of fire-damp occurred at Felling Colliery, near Newcastle, England, by which eighty-nine miners lost their lives. Previous to this time, in the history of mining, many lives had been lost in the mines of Europe. That coal mining was a dangerous occupation, owing to the presence of inflammable gases in the mine, was generally acknowledged from a very early period, but as fuel must be had, many hazarded their lives, believing that the danger was unavoidable. Candles stuck into a ball of clay, fastened to the sides of the chambers near where the miner was working, were the chief lights once used, and owing to these open lights coming in contact with the gases of the mine, accidents were almost of daily occurrence. At the time of the great disaster alluded to the public conscience was aroused, and special attention was directed to the matter of endeavoring to

protect miners in some way. Sir Humphrey Davy was then a conspicuous figure in coal mining districts. After a triumphal tour of brilliant experimenting through France and Italy, he returned to London in April, 1815, and in a short time had his safety lamp completed. When Sir Humphrey Davy had his lamp perfected to a point of safety, he and Mr. Buddle, one of the chief colliery owners in England at that time, went down to Newcastle and traversed a number of the most dangerous mines of the Bentham seam with impunity.

About the same time George Stephenson was inventing a similar lamp to that of Sir Humphrey's, and as others were also experimenting, it was considered that coal mining disasters from explosions were then at an end. However, such was not the case. Notwithstanding all the safety lamps and other appliances invented to protect the miner, explosions and ignitions of fire-damp in mines are yet dangerously common. The history of coal mine disasters in the past leaves no room to doubt that the lessons of perfect obedience and watchfulness are hard lessons to learn. It has often appeared that in the face of all precautions and rules, to be observed by the miner, there is always some carelessness or blundering manifested by some one, and the error is learned too late to prevent the result.

The following disasters are among the most destructive coal mining explosions recorded:

At Newport, England, in 1860, one hundred and forty-five were killed.

In 1862, at the Hartley Pit, on the Blyth and Tyne Railway, near Newcastle, on the 16th January, a heart-rending disaster occurred, resulting in the death of two hundred and four miners. The pit was six hundred feet deep, worked by a shaft. Eight men were coming up in the cage, when the beam of the pumping-engine broke and the mass of twenty tons of iron dropped down the shaft and lodged with the wreckage it caused before it reached the bottom, thus shutting off the only egress to the pit. To get down in time to save the living was impossible. When the ruins had been removed a week after the accident, a rescuing party descended and found the dead all within the space of one hundred and fifty feet from the bottom of the shaft —all had perished. One man was sitting as if resting from his day's work. Behind him, on the gallery, were the men and boys seated in three rows and all asleep in death, as if waiting for the rescue that was to come too late. Some boys sat with their arms on their father's shoulder, and brothers

clasped in each other's arms. One man was propping up a door beyond the other sleepers, as if he had resisted the poison longer than the rest. At the feet of some of the dead were found candle-boxes with such messages scratched on them as these: "Mercy, O God." "My dear Sarah, I leave you." "If Johnny is alive, tell him to be a good boy to his God and his mother." When the funerals commenced it was found that every cottage in the place had its coffin, some had two, one had five, and another seven.

In 1866, at Oaks Colliery, near Barnsley, three hundred and sixty lives were lost. Again, at the Swaithe Main explosion at Barnsley, on December 12th, 1875, one hundred and forty-three perished. These Barnsley mines are situated in West Riding of Yorkshire, one hundred and seventy-one miles from London.

At Avondale, near Plymouth, in Luzerne County, Pennsylvania, on the 6th September, 1869, one hundred and eight persons were killed. This was one of the most notable and peculiar coal mining disasters known. The calamity was caused by a young man named Palmer Steele going down the shaft with a load of hay for the horses in the mine. When descending the shaft the hay caught fire.

The engineer saw the flames and lowered the carriage with all haste. In a few minutes the flames were leaping one hundred feet upwards from the top of the shaft, and in a short time the surface buildings were a mass of ruins, blocking up the only entrance to the pit. A few hours after the fire ceased the debris was cleared away, and two men named Williams and Jones descended to search for the miners. These men had only proceeded a few feet from the bottom of the shaft when they fell dead from the effects of white-damp. The fire occurred on Monday, and two days after, when a thorough ventilating current had been established, a rescuing party descended, went up the plane some distance from the foot of the shaft, and found a mine car placed as a barrier across the gangway, and the space between it and the walls packed with clothing. On breaking this barrier no person was found behind it. A short time after another party was able to proceed a little farther, and discovered a similar barricade. Outside this barrier lay a dead body, and behind it lay one hundred and five other dead bodies, who had evidently all been suffocated by the poisonous gases. The experience of these imprisoned men shall never be known, as no one was left to tell the story of how they died.

In the Monis Mines, Belgium, in 1875, the killed numbered one hundred and ten. Two hundred lost their lives at the High Blantyre Collieries, near Glasgow, Scotland, in the year 1877.

In 1878, at the Ebbw Vale Collieries, situated in the neighborhood of the Monmouth and Brecknock Iron Works, one hundred and seventy-eight miles north-west of London, two hundred and sixty-eight were killed. A short distance from the same vicinity, in 1880, at Risca Mines, on the River Ebbw, Monmouthshire, one hundred and twenty perished. Again, at Seaham disaster, Durham, in the same year, one hundred and forty miners were killed.

This mine is situated down the Durham coast in the thriving seaport of Seaham. It is owned by the Marquis of Londonderry. The explosion took place about two o'clock in the morning, and was so terrific that the whole neighborhood became aroused as if by an earthquake. As a local flower show was to be held on a coming holiday, and one of the miners who had won the Queen's Prize of Shoebury was to be presented with it by the Marchioness of Londonderry on that occasion, an extra number of hands were in the mine. Nearly two hundred were at work at the time of the explosion, which occurred from an escape of gas shooting out from the face

the workings. The wreckage was fearful. The brattices was set on fire, and besides the great number of miners who lost their lives, two hundred and fifty Shetland ponies were killed.

November 9, 1888, a terrible explosion of coal dust occurred in a mine at Pittsburg, Kansas, causing the death of over one hundred men. But the dreadful explosions at

THE DRUMMOND COLLIERY AND FORD PIT,

in Pictou County, Nova Scotia, in the years 1873 and 1880, although the loss of life was not so great as in some of the other disasters referred to, yet, owing to the awful nature of the circumstances connected with each case, they are, perhaps, unparalleled by any other. The writer has been able to glean the following record of these disasters from various authentic sources:

The Drummond Colliery is situated at Westville, a thriving town of about four thousand inhabitants. This colliery was first opened in the year 1865. At that time the entire surroundings were a dreary barren district, partly covered with young juniper, poplar and birch, as the forest fires had destroyed the large pines and hemlocks that had once flourished in the place.

In this vicinity there are now three differen mines in active operation, known as the "Acadia, "Drummond" and "Black Diamond" Pits. Th Drummond Colliery, although first to commenc operations, had been shut down for several year previous to its purchase by the Coal, Iron and Stee Company some two years ago.

This colliery commenced active work in the yea 1868, and a railway extension of six miles to th Middle River was built for the purpose of shipping the coal. In the following year this colliery, unde the management of the late James Dunn, Esq. was fully equipped for work, so that the output i 1872 amounted to 105,000 tons. The next year when shipping had commenced, and elaborate pre parations had been made for extending the output a strike of the miners, who desired higher wage and certain privileges, closed the workings for on week. An agreement having been made with th men, work was resumed on the 13th of May, 1873 and everything went on as formerly until half-pas eleven o'clock, when a shot fired in one of the lowe levels on the south side of the pit caused the coa to ignite.

Every endeavor was made to check the fire but it spread rapidly, and an order was given tha

all hands not volunteering to assist putting it out should leave the pit. To remain in the mine was almost impossible, owing to the immense smoke that prevailed, and with the exception of about a dozen who remained with Joseph Richardson, the Underground Manager, to battle with the flames, all hands started to make their escape. Whilst the men were endeavoring to get out, a terrific explosion took place, dealing death and destruction on all sides.

So great was the force of the explosion that the wooden rope rollers were torn from the track and hurled out of the slope as from the mouth of a cannon. Timbers fourteen feet long by nine inches thick were thrown out with great violence, and the immense rush of air was so great that it swept away the exposed roof of the bank head. A second explosion took place two hours after the first, killing four men who were nobly endeavoring to rescue some men who were known to be alive at the bottom of the pumping pit.

This second explosion completely destroyed the ventilation, and as all hope of saving life was taken away, attention was directed to saving the property. All water available was turned into the pit to cut off the lower workings and seal the bottom of the pit if

possible, but despite all efforts made to do so, the fire raged for thirty-six hours with dreadful fierceness, the flames shooting upwards from the many openings along the crop, to a height of from thirty to forty feet.

In two days after the explosion the openings had been filled, and the fiery grave of those who perished in the pit was effectually sealed. At the end of October an opening was effected to the mine and the air allowed to circulate for a short time, when it was found that the heat was still sufficient to cause further combustion. Owing to this matter the mine was again closed. A new pit adjoining, however, seventy feet deep, was sunk immediately, and under the supervision of Robert Simpson, M. E., who had been brought from Glasgow as manager, a new slope was driven to the south of the old workings, and in three years most of the water had been pumped out, the debris removed, and the colliery with its three working inclines, was in good position for future operations. As to the number of lives lost in this explosion there is difference of opinion. Some give it from sixty to seventy-five; one good authority records it thus: "The total number of lives lost was sixty, among whom was Mr. Dunn the manager; thirty-one were married men, twenty-

eight single men, and one boy, leaving twenty-nine widows, eighty orphan children, besides parents dependent on the lost. Contributions to the amount of about $23,000 were made in various parts of the Dominion and the United States for their relief."

The Ford Pit is situated at Stellarton, on the west side of the Intercolonial Railway. It was opened over twenty years ago, and equipped with the best machinery available at the time for a large output of coal, and every possible arrangement was made for the safety of the operators. The hoisting shaft struck the main seam at a perpendicular depth of nine hundred and sixty feet, but the bottom level was one thousand feet.

The seam had been successfully operated for some time, when, on Friday, November 12th, 1880, about half-past six in the morning, an explosion occurred on the south side of the pit. All the miners were at work in the different bords. The explosion was so terrible that it swept across to the north side of the pit. The pit had north and south entrances. Owing to this all the men and boys on the north side were safely got to the surface, with the exception of a few who were badly affected by the deadly after-damp.

There were over fifty miners on the south side

when the explosion took place, and of these only two men and four boys were rescued alive.

As the pit took fire after the explosion, and burned with awful violence, none of the dead bodies could be recovered. In order to save the mine from utter destruction, the waters of the East River were let into it. It took seven years to pump the water out of the pit. This was accomplished over a year ago, and the Ford Pit is now in successful operation.

CHAPTER XVII.

Dangers of Coal Mining Operations.

Coal mining has long been considered one of the most dangerous occupations of man. One of the chief dangers to which the miner is subjected arises from the escape of destructive gases from the coal. This gas is light carburetted hydrogen, and is identical with the marsh gas, which the student of elementary chemistry is taught to believe is a product of vegetable leaf decomposition under water, bubbles of which rise to the surface on stirring the waters of a stagnant pool. This gas is called by miners

Fire-Damp.

It is tasteless, colorless and inodorous, and is given by some authorities as consisting of four parts of hydrogen to one of carbon, and about one-half the weight of air. Being thus lighter than air it naturally rises to the roof of a mine chamber, and as it accumulates it extends downwards. When mixed with ten times its volume of atmospheric air, or twice its volume of oxygen, it becomes violently explosive on the application of the open flame of a

lamp. In its unalloyed state it is non-explosive and inflammable, burning with a bluish-yellow non-luminous flame.

One of the most dangerous features of this gas is that it sometimes escapes copiously and suddenly from a cavity in the coal seam. This rush of gas from the crack or seam is called a "blower," and in this state it is said to contain, besides the carburetted hydrogen, from one to four per cent. of nitrogen, and about one per cent. of carbonic acid. Its presence being hidden in a cavity of the coal, the miners' drill may free it at any moment, or it may burst by its own power through the facing, causing immediate destruction to those working in the vicinity. One thoroughly acquainted with mining operations describes it thus:

"When the naked light of the miner comes into contact with any considerable quantity of fire-damp in an explosive state, the shock that follows is terrific. Men and horses, cars and coals, are hurled together to destruction. Walls are swept out, iron rails are bent double, doors are torn from their fastenings, the mine is laid waste."

It is well known that the damage resulting from explosion of gas is greater than that due to mere ignition, and burning without the explosive force

The danger to the miner in the latter case, however, is but slightly diminished, and he is liable to receive fatal injuries. The burning lamp of the miner bursts into flame on coming in contact with the body of fire, and is quickly propelled along the roof of the chamber. This fire-damp, in its destructive course, collecting enough oxygen from the atmospheric air to add fierceness to the combustion, often returns to the face of the chamber with "a violent contractile surge, scorching everything in its path, and then, perhaps, after another brief sally, it burns itself out."

The miner who accidentally fires a block of fire-damp in the pit should immediately fall on the floor, covering his eyes, mouth, and nose so as to save them from the heat and flame, at the same time clasping his hands over his neck and head to protect these parts from injury. In this position, however, he must not long remain, as the flame will soon burn itself out, and the fatal after-damp is sure to follow quickly. His only safety from certain death lies in immediate flight as soon as the flame has passed over him.

In mines where gas is found even in small quantities the miner should not enter his chamber until it has been brushed out into the air current.

The most dangerous accumulations of fire-damp, however, are not found in working chambers, but in portions of the mine worked out and abandoned. Collected in these sections in large bodies it remains unnoticed until some person, ignorant of its presence, approaches it with an open lamp, when an instant explosion is the natural result.

A fatal explosion occurred from such a cause on the 14th of August, 1871, at the Eagle Shaft of Pittston Colliery, in the State of Pennsylvania. On the morning of that day, at nine o'clock, a boy named Martin Morgan was driving a mule with a trip of mine cars along an upper gangway. In a worked out section of the mine above him a large body of fire-damp had been allowed to collect, and as the boy passed a sudden fall of roof in the abandoned works drove out the inflammable gas, which, on touching his lighted lamp, exploded with terrific force. The explosion was so great that people heard it a mile away, and hastened to the scene of desolation. The dead bodies of seventeen miners who were working in the vicinity of the explosion were discovered the following day, all of whom had been killed by the after-damp.

One of the chief dangers to the miner from the burning of fire-damp is in the product of its combustion, known as

After-Damp.

This gaseous substance consists chiefly of carbonic acid and nitrogen. It will be seen by referring to the Glossary that it is a mixture of gases resulting from the burning of fire-damp. As it is heavier than atmospheric air, it consequently falls to the bottom of the mine immediately on its formation from the burning of the light carburetted hydrogen. Being intensely poisonous in its nature, and irrespirable, immediate insensibility and death is the result of the first inhalation of it in its pure state. So quickly does this gas form, and so deadly is it in its effect, that there is no escape for the miner, who has fallen on his face to save himself from the fierce flame of the burning fire-damp, but in immediate flight as soon as the fire has passed along.

Another destructive gas with which the miner has to contend is the presence of

Black-Damp.

This damp is carbonic acid gas, and is given as containing two parts of oxygen to one of carbon. It is the chief constituent of after-damp, and is often called "choke-damp," as they are both composed of the same elements and produce the same effects.

Black-damp is said to escape from the coal the same as fire-damp. It is also given by good authority as one of the products of burning coal, of burning oil, and of the respiration of man and beast. It is one and a half times as heavy as air, and is therefore always found next to the floor of the mine. An expert says of it: "Its presence may be detected by the conduct of the flame of the lamp. In an atmosphere containing but a small percentage of it the lamp light will grow dim, and, as the proportion of gas increases, will become more and more feeble until it is finally extinguished. An atmosphere containing from eight to ten per cent. of this gas may be breathed without immediate danger; it will simply occasion dullness of intellect and numbness of body. This condition changes into one of insensibility as the inhalation continues, or as the percentage of gas is increased, and to enter an undiluted body of it means sudden death." Of all the gases in the mine, however,

WHITE-DAMP

is the most to be dreaded. A practical miner of experience says of this gas: "It is possible the miner may conceal himself from the surging flame of the fire-damp, and force his way through bodies of

black-damp, but if he comes in contact with an accumulation of this terrible white-damp, instant death is almost certain. Being tasteless, colorless, and odorless, its presence cannot be detected before it has done its work of death. It is pure carbonic oxide, and is composed of equal parts of oxygen and carbon. It is a fraction lighter than atmospheric air, and has therefore a tendency to rise. It is supposed to be formed when the carbonic acid passes through any ignited carbonaceous material, or when the steam passes over burning coal. It is held by some to be produced most frequently by smouldering gob fires, by burning wood in the mine, or by a shaft on fire, and may exist as one of the results of an explosion of fire-damp or of blasting powder. It acts on the system as a narcotic. It is generally incombustible, and produces no effect upon the flame of a lamp. If present in a state of purity it burns with a blue flame."

One mining engineer of repute says of this destructive element: "When a fire started by a stream of gas coming from a crevice which has burnt long enough to cause great heat, carbonic oxide gas is generated. When this gas is present, a fire burning at the crevice may have been dashed out completely; but if a certain amount of heat is spread about the

locality, and fresh air is allowed to mingle with the carbonic oxide, an explosion will, by their contact, ensue. * * * This gas seems to require nothing more than heat and fresh air (without flame) to start a conflagration. Who knows that this gas has not been the cause of serious mischief in mines by being generated from coal dust burning within the wire cylinder gauze of a safety lamp?"

Coal Dust

in the mine is another dangerous element, and has hitherto failed to receive the attention it should. Whatever opinions may be held as to the harmless nature of coal dust as an explosive agency, it has lately been authenticated by good authority that under certain conditions it may become violently explosive. One practical authority states: "When it is mixed with air, with or without the presence of fire-damp, and is set into sudden and intense vibration by a heavy powder blast, a fall of roof, or other means, it may explode with greater destructive force than even fire-damp is capable of." Another undoubted authority says: "In coal mines coal dust and coal gas form the active combustibles. Coal dust so finely pulverized disseminated through the air as to be almost imperceptible, forms a dangerous

constituent, and one which does not receive the attention it merits. It is a more unmanageable ingredient than coal gas itself." The same authority states: "A swift current of air traversing a mining passage, not having its sides moistened by artificial or natural means, gathers up the dust on its route and bears it through the working places. * * * The strong men who work a few years in such showers of dust become weak, and their faces blanch from the continuous absorption of the coal dust into their systems."

The inflammable nature of dry coal dust can easily be ascertained by throwing a portion of it into a bright fire. If the circumstances are favorable it will ignite almost as quickly as gun-powder. The writer has tried it more than once.

Some good authorities assert, however, that coal dust is not inflammable without the presence of from five to six per cent. of fire-damp, when combustion will take place by bringing an open lamp into contact with it. The Prussian Fire-damp Commission, who lately investigated this matter, states: "The presence of coal dust within the radius of an explosion greatly increases the force of it, and with certain sorts of dust an explosion may result even in the absence of fire-damp."

CHAPTER XVIII.

Safeguards Against Accidents in Mines.

The first essential element to the safety of health and property in a coal mine is the quantity and purity of the atmospheric air circulating through the chambers of the workings. As man is an air breathing animal he must die if the supply of air essential to his existence be cut off. The mine will also suffer destruction from the explosions of poisonous gases if they are not driven out by a current of fresh air as quickly as their formation takes place. The first requisite, therefore, in mining operations is the establishment of a proper air current in order that the ventilation shall be good. Although the atmospheric air will find its way into the mine through the surface openings, yet, if not replaced by fresh air in a short time, it becomes dead and unfit to breathe.

If, while lying in this dead state, it takes up the poisonous gases which are sure to escape from all coal measures, it soon becomes fatal to human life and an explosion may take place at any moment. Hence the necessity of a living continuous curren

of pure atmospheric air, circulated in abundance to carry off these foul gases and give life and vigor to the entire workings. But as the air current goes nowhere by chance, the air channels should be so arranged that no portion of the mine be left without its direct air current. On this

THOROUGH SYSTEM OF VENTILATION

depends the lives and health of the workmen and the successful operation of the mine. If the ventilating system be imperfect, no security of life or property can be expected. One who is familiar with the whole system of ventilation says: "A failure of the air current for even an hour might in some mines result in the death of all those who chanced to be inside, for this current not only supplies air for breathing purposes, but it takes up the smoke, the dust, the dangerous and the poisonous gases, and carries them to the surface" through the upcast air shaft.

PROPER DRAINAGE

of the mine is another important matter that cannot be disregarded with impunity. If an overflow of water is allowed to collect and remain for a certain time in any part of the workings, it becomes im-

pregnated with the germs of disease and death, and the gas bubbles thrown off may assist leading to actual accidents with fatal results.

The following rules, given by a practical mining engineer of high standing, will be found sovereign safeguards against accidents in mines:

Keep in advance all dead work, and where gas is very abundant, and the slips and crevices frequent, bore ahead holes not less than four inches in diameter and twelve feet in length. By the examination of these bore-holes daily, an idea of the quantity of gas contained in the coal may be formed, and sudden outbursts, to a certain extent, avoided. The gas will drain off through such bore-holes very rapidly, but with much greater regularity than if such bodies of gas were let out by the sudden removal of large quantities of coal, as in the case of blasting.

Daily examine the abandoned excavations, and note the state of the air within them.

As often as necessary to keep the air sweet and respirable, divide the ventilating air current. Let the amount of coal cut in any particular district regulate the amount of air sent to it, more than the extent of such district. Thus, if you mine a hundred tons of coal in a run daily, send in the air t

this run or breast in sufficient quantity to dilute the gas given off by the mining and breaking up of those hundred tons of coal. Let the air passing from such part of a mine get into a return air course in the most direct manner possible, by passing it direct to an upper level; or, if this is not practicable, pass it into a return air course, such as a monkey gangway, by carrying it over a main course by means of an air crossing. If you have

SPACIOUS AIRWAYS,

and these you must have in order to obtain good and sufficient ventilation, use regulating doors to govern the "splits," and lock them securely at each setting. Place regulating doors at a point in the return where the air of its district is making its final exit before it joins with the main out-going current. Use as few air doors as possible, and none at all in the main intake air courses which wagons have to traverse. Build air stoppings so well and bind them so securely that the force of an explosion will not carry them away.

Drive air crossings in the solid strata where it is possible to do so. When this cannot be done build them in the most substantial manner, binding them so securely by strong iron hoops or cribbing so

that they may be able to stand the force of an explosion acting under the archway.

Make air courses as straight, direct and capacious as possible. Duplicates of all mechanical appliances required in the ventilating force should be held in readiness to quickly replace those in use if destroyed by accident.

All mine officers should be able to discover the presence of gas in the air, and to judge of its quantity by the manner in which it burns over the flame of a candle. Two per cent. of carburetted hydrogen in the air can easily be detected by the flame of a closely snuffed candle, or by the flame of an oil lamp being reduced to burn brightly at its minimum, which may be done by clearing off the top of the wick, and the pulling of it down so that its top will be even with the level of the tube. By the use of a flame of hydrogen, on account of its great heat, the gas in the air may be burnt, and its flame seen if its proportions in the air are as low as one-half of one per cent. By burning this flame in pure air, and then in a mixture of air and gas, the difference, which is marked, can easily be discerned.

If the percentage of marsh gas is small the flame simply lengthens out and becomes smoky. If the gas is mixed with from eight to fourteen times its

volume of atmospheric air, the flame of the wick entirely disappears, and the interior of the cylinder becomes filled with the blue flame of burning gas. To remain with the lamp long in this latter position is dangerous, as the wires will soon become red with heat, and the outer gas may become ignited from them at any moment. It may be learned from this that even the safety lamp is not an absolute protection against danger from explosive and inflammable gases. Taking all things into consideration, it becomes obvious that there is really no protection from accidents resulting from explosions in mines where a copious current of pure air is not allowed to enter. Timbers, safety lamps, hoisting gear, and other necessary appliances, should have careful attention daily. As defects of these appliances can be seen by the eye, they may be detected by any person who is at all acquainted with them; but the nature of the air in the mine, which is often laden with the elements of death, may at any moment seal the doom of the unsuspecting miner, who is not aware of the presence of his enemy until it is too late. The following advice, by a practical engineer, if adopted generally, would, no doubt, prevent many disasters in mining operations: "All mines should be so well inspected daily by its own staff of officers

as to render the inspection of them by any government officer unnecessary."

According to Underground Manager Conway's report this system of daily inspection at Springhill mines was faithfully attended to; and there is also no reason to doubt that the air current in the mine where the explosion occurred was inefficient in any way. However, notwithstanding all the care formerly exercised by the officials of these mines, greater care shall, no doubt, be taken in future. One who is in connection with these collieries, in a communication to the press a few days ago, states:

"Since the explosion all open lights have been superseded by safety lamps. Great care is observed in handling these lamps. There are about 1,000 in use. They are principally 'Marsaret' and 'Clanny' lamps, with an occasional old-fashioned 'Davy' for testing purposes. The 'Davy' lamp is relied upon for gas testing purposes, as it will detect a smaller percentage of gas than either the 'Clanny' or 'Marsaret.' The 'Marsaret,' familiarly known among the miners as the 'boiler lamp,' is extinguished by the presence of gas in sufficient quantities to be dangerous. These lamps are all locked by keys on and in the possession of lamp lighters, and tampering with a lamp is an offence punishable by dismissal

and fine in court. No matches are allowed in gaseous parts of the mine, and the pockets of the workmen are frequently searched."

The day is coming, no doubt, when the accidents in coal mines from explosions will be reduced to a minimum by the use of

ELECTRICITY IN THE MINE

instead of oil. This mode of lighting the streets and stores of our towns and cities is now being adopted generally with great satisfaction, and, according to the writer's opinion, there is no just reason that can be given why he, whose lot it is to work in the subterraneous caverns of the earth, should be compelled to labor in semi-darkness, were there no other consideration, when science has brought to his aid a ray of light that will illuminate his path and cheer up his gloomy chamber with the brightness of the noonday sun.

By the use of this light in the mine the miner's danger from explosions would not only be reduced, but his appearance, as he passes from the mine to his home, would be improved. As it now is, coming up out of the mine with his face, hands and garments black with coal dust, powder, smoke, and saturated with oil from the little tin lamp which is

hooked to the front of his cap, his features are often hard to recognize. Although the dust would settle on his person as formerly, yet the absence of oil would enable him to remove it more easily, and his whole life, and that of his family, would be cheered by this new ray of light beaming in his working apartment. Mining operatives, as a general rule, are as intelligent, law-abiding, peaceful, sober and industrious citizens as artisans and others who work in the outside world, and have a claim to share in all modern improvements and conveniences that science and art can devise. Where the miner gets a chance, his possibilities of advancement are perhaps greater than any other class of workers. Mine superintendents, inspectors, managers and other mining officials are always wanted, and young men of character, judgment and skill are generally promoted from the ranks to fill the higher positions. It is also well known that in many coal regions lawyers, preachers, bankers, merchants, clerks, engineers, contractors, and others have stepped into those higher positions from the chambers of the mine. As it was in the past so it is to-day—"there is room at the top" for faithful workers of skill and enterprise.

CHAPTER XIX.

History of Springhill and its Collieries.

An historical sketch of the mines where the great disaster occurred, and of the town that has risen about them, being considered of special interest to the general reader, the writer has made extra endeavor to collect material for this chapter bearing on the subject.

So far as the writer has been able to ascertain, there is no reliable record as to who made the

First Discovery of Coal at Springhill,

or at what date the discovery was made. In the year 1834, however, a gentleman named Lodewick Hunter was operating a small mine at the place, and selling the coal to blacksmiths in the surrounding country.

Mr. Charles Dixon Lockhart, who now resides in Hartford, Carleton County, New Brunswick, was then an apprentice lad to Thomas Leak, carriage-maker, who lived at Westbrook, a village on the post road leading from Amherst to Parrsboro, fifteen miles from the mines, and in that year

carried a load of the coal which was used by Mr. Leak in his forge. Fifteen years afterwards he again visited Springhill and in interview with the writer, states that an exploring crew were then to work at the place. Mr. Lockhart was seventy-three years old on the 14th of February last. He is hale and strong, and has full remembrance of his long trip through the woods after the coal when a boy of only sixteen. An incident connected with his second visit to the place settled the date also vividly in his mind. This statement of Mr. Lockhart is supported by another undoubted authority stating that, about the year 1849, Thomas Bell and William Patrick were employed, under the direction of Joseph Smith, the Albion Mining Company's Engineer, to explore at Springhill chiefly with the design of locating the four square miles contemplated in the area. It is recorded by one of the exploring parties, that previous to their work, one of the large seams which is now in operation had been opened in the bank of a brook and from which coal was then being mined for smithing purposes, etc.

It is also given upon good authority that in 1863, William Patrick, one of the exploring parties referred to, induced two American gentlemen, named Howe and White, to visit Springhill in company

with him for the purpose of locating a mining area and working it. But after reflecting on the great expense necessary to reach a shipping place, as there was no prospect of a railway ever coming that way, together with the fact that a clause in the mining law bound the parties or company leasing mining property to open and work the mine efficiently within two years, or the lease would then become void, and the property and what improvements might be made upon it should go to the Government, they abandoned the enterprise. At this time another vein, besides that which had been opened by Hunter, was being operated in a small way by William Simpson, who is credited as securing

THE FIRST GRANT OF LAND IN SPRINGHILL.

About the same time Nathan Parks, who then lived at Springhill, but now resides in Lewiston, Maine, commenced operating another portion, under the privilege of Mr. George Hibbard, of River Hibbard, who owned the property, Mrs. Parks having made the discovery of the coal outcrop during a stroll one afternoon through the woods.

A short time afterwards Messrs. James Hickman, Charles J. Stewart, C. Milner, J. H. Harding and some others secured the right to search over the

Springhill coal areas, and after selecting a few hundred acres, the right to begin operations was secured.

After samples of coal had been taken out of several places and submitted to due inspection, the prospects were so good that Messrs. Charles H. M. Black, Alexander Macfarlane and Chas. J. Stewart became deeply interested in the enterprise, and, in 1870, secured an Act of Incorporation to establish a company for the purpose of operating the mines. This company was to be called

"THE SPRING HILL MINING COMPANY,"

and the act to incorporate it was passed by the Governor-in-Council and Assembly of Nova Scotia on the 18th day of April, 1870. The Act of Incorporation states that "the capital stock of the company shall be four hundred thousand dollars, in shares of not less than fifty dollars each, which shall be personal property, transferable and assignable as such by assignment recorded in the books of the company; and the company shall have power to increase their capital stock to one million dollars by the issue of new shares by a vote of a majority in interest of the stockholders, but the company shall not go into operation until twenty-five per cent. of the capital

stock shall be actually paid up. The company may issue stock in payment of lands, mines, mining leases, or rights or other property on such terms as the directors may deem best, and such stock shall be deemed full paid up stock as if paid in money. The company may also issue bonds, bearing interest, payable within Canada or England, or the United States of America, and if deemed expedient secure the same by mortgage of the property or franchises of the company, and dispose of the same in such manner and at such price as the directors may deem best." The 10th section of this Act states that it "shall cease and determine if efficient work shall not be constructed and continued under it within two years from the date of its passing." Having secured this Act of Incorporation, a company was formed, and operations commenced at an early date; but owing to lack of facilities to remove the raised coal from the vicinity, it was slow work, the coal having to be carted a long distance through the woods to Athol, Salt Springs, and other places. The greater portion of the coal raised was used by the locomotives which were in operation ballasting the Intercolonial Railway between Amherst and Truro. However, much prospecting was being done by John Anderson and several other interested parties in the

coal areas of Springhill. Samples of the coals were sent to various places, tested, and pronounced "first-class" by all who had used them. Springhill soon became a household word. Capitalists grasped the idea that there might be something in it worth looking after. Works bearing on the great coal fields of Nova Scotia were scanned as never before, and

A "BOOM" WAS COMMENCED

under the leadership of E. N. Sharp, a stock broker of St. John, that soon resulted in the formation of a company to build a railway from the mines to Parrsboro, and operate coal measures adjoining the other company's property.

Mr. Sharp being earnest, eloquent and good looking, commanded a hearing in all places he visited. Armed with his coal samples, subscription list and prospectus sheet, he was, it is said, a far more imposing personage than George Washington, when canvassing as a book agent for "How the American Savage may be Tamed by the Weapons of Civilization." The following is an extract from Mr. Sharp's prospectus: "In this coal field have been discovered several seams of coal of excellent quality; among which are a thirteen feet six inch seam, an eleven feet three inch seam, and a six feet seam, and other

from four feet to four and a half feet each in thickness. The outcrops of some of these seams have already been traced for about one mile into the company's area, and probably extend at least another mile. In an adjoining area are the collieries which have lately been opened on the eleven feet three inch seam, testing this seam of the group to a depth of five hundred feet. The Springhill coal field is situated near the centre of the triangular County of Cumberland, about twenty-seven miles from the Harbor of Parrsboro, on the Bay of Fundy, to which it is proposed to construct a railway."

During the time that Mr. Sharp was talking up the enterprise in St. John the "missing link" of the Intercolonial Railway between Amherst and Truro was being completed. A connecting line from the mines to the Intercolonial Junction was also under consideration. This line was built by the Springhill Mining Company immediately afterwards.

The first passenger train from St. John to Halifax was run on the 17th November, 1872, and the first car load of coal that left Springhill mines by rail was taken to the Junction in the fall of 1873 by Mr. Hugh Tait, engine driver on the Intercolonial.

Owing to the exertions of Mr. Sharp and others many of the shares of the Springhill Mining Com-

pany were purchased by a large number of capitalists, chiefly composed of St. John merchants. Some amendments to the Act of Incorporation were passed the 7th of May, 1874.

The by-laws of this company record that the officers of the company shall be five directors, of whom one shall be president, a treasurer, and a secretary. The treasurer shall give bonds and other securities satisfactory to the directors, for a sum not less than ten thousand dollars. He "shall have the custody of all valuable papers and documents of the company, subject at all times to the inspection and control of the directors, and shall make his cash deposits in the Bank of New Brunswick, or such other bank as the directors may appoint, as the money is received, and his book account shall be kept in the name of the company, and all cheques to draw the same shall be signed by the president or two directors, and countersigned by the treasurer." The by-laws also state "The corporate seal of the company shall be a circle bearing the name of the company and the year 1872, of which seal the treasurer shall have the custody." It is also recorded in these by-laws that "The office for conducting the general affairs of the company shall be located in St. John, N. B., or such other place as

he directors may hereafter appoint, with the consent f two-thirds of the stockholders represented at a pecial meeting called for the purpose." Alex. Macfarlane, of Wallace, N. S., was president, and William E. Vroom, of St. John, treasurer. Among the largest stockholders in this company were Alex. Macfarlane, Magee Bros., James L. Dunn, Sanford Fleming, Edwin Frost, R. B. Dickey, Hall & Fairweather, J. & W. F. Harrison, George McLeod, John W. Nicholson, W. J. Ritchie, Robert Reed, Charles J. Stewart, George F. Smith, R. P. & W. F. Starr, W. W. Turnbull, John F. Taylor, William L. Black, J. P. C. Burpee and Charles Merritt. These gentlemen owned from one hundred to nearly one thousand shares each.

An Act of Incorporation was secured in 1872 by Messrs. John Taylor, John D. Thompson, George Hibbard and John T. Wilde to form the other company Mr. Sharp had worked up, known as the

"SPRINGHILL AND PARRSBORO COAL AND RAILWAY COMPANY, LIMITED,"

ith a capital of $1,000,000, with power to increase $5,000,000, in shares of $100 each.

This company was organized in 1873, with the llowing Directors: Robert Reed, John Taylor,

George Hibbard, William Magee, George F. Smith, Edwin N. Sharp, and Edwin Fisher. Mr. Reed was appointed President, Mr. Sharp, Secretary, and Mr. Magee, Treasurer. James J. Kaye, Q. C., was also appointed Solicitor.

Subsequently, Mr. Reed having sold his stock, Mr. Edwin Fisher was appointed President.

The first meeting of the company was held in the Board of Trade Rooms, St. John, on the 16th October, 1873, when a code of by-laws similiar to that of the Springhill Mining Company was adopted.

The prospectus of this company states that it "was incorporated for the purpose of building a railway from the coal fields of Springhill to Parrsboro, and for the purpose of developing certain coal properties within and contiguous to the Springhill district."

According to this prospectus the net profit the first year was to be $9,000, and the second year, $37,000, "assuming that the coal supply be ready on the completion of the railway." The road was to be a narrow-gauge line of two feet nine inches, of easy construction, with a down grade nearly the whole length from the mines at Springhill, five hundred feet above the sea level, to the port of Parrsboro. The estimated cost of the road was $280,000, with an extra $120,000 to construct a

"wet dock," which was considered indispensable for a large traffic.

It is also recorded in this document that "The company have acquired by purchase, and now hold, under lease from the Government of Nova Scotia, three square miles of the richest coal deposits in the Springhill coal district, Cumberland County, Nova Scotia, and four hundred and thirty acres of land, in fee simple, situate most advantageous for purposes of opening and working collieries on the company's mining area, and capable of supplying the timber required for the mine." It moreover states that this company, by Act of the Legislature of Nova Scotia, had been granted a subsidy towards the construction of the railway, amounting to five thousand dollars a mile, and also ten thousand acres of timber lands.

Such inducements to speculators being irresistible, many arranged for shares in both companies. Preparations were made to work the collieries on a large scale, and the mines, to be operated by extensive machinery at Springhill, were formally opened with a grand jubilee held in the vicinity, June, 1873. Many excursionists from St. John and other places met at the mines to celebrate the great event, which introduced a new state of affairs at the mines.

justly commenced at this date. A few days previous to the jubilee, Mr. Hall, who was to manage the collieries for the "Springhill Mining Company," had arrived at the mines, and was looked upon as one who would soon infuse new life into the workings. Mr. Hall is a native of Durham, England. He started in life as a trapper in an English colliery. When a young man he came to America, thirty-eight years ago, and worked his way without friends or influence. He came to Springhill from the Albion Mines, Pictou County, on the 20th May, 1873, to act as manager of the Springhill Collieries. Previous to this date, Mr. Hall was underground manager of the Albion Mines. As a colliery manager Mr. Hall was most successful. He resigned the position which he had held for nearly seventeen years on the first of April, 1890. He is now Mayor of Springhill, is largely interested in real estate of the place, and takes an active interest in all matters pertaining to the welfare of the town.

At the time Mr. Hall came to Springhill the place was a dense forest, with the exception of a few small clearings in the neighborhood, which had been made by some settlers who had come to the vicinity some thirty years before. These settlers

WILLIAM HALL,
Mayor of Springhill at time of Colliery Disaster,
and for seventeen years Manager of the
Springhill Collieries.

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ASTOR, LENOX AND
TILDEN FOUNDATIONS.

included Nathan Gilroy, Barney Gilroy, Thomas Dodsworth, Lodewick Hunter, and Wm. Simpson. A good authority assures the writer that in 1871 there were only five small houses and twenty inhabitants in the whole region, and that Dr. Cove, who then resided at River Philip, was the physician to these people.

Immediately after operations commenced under the management of Mr. Hall, two rows of double tenement houses were built for the use of the men operating the mines. The following year another block was built, making in all accommodation for forty families.

An office for the use of the cashier, Mr. John Cooper, was also erected in 1873. The following year the place contained five stores, one church, one hotel, seven saw mills, and had a population of two hundred.

In 1873 the West Slope was sunk to a depth of 600 feet. The East Slope was also sunk in the same year, and the following to a depth of 800 feet, which formed the first lift of this mine. Work at the mines was pushed forward with vigor. The Springhill Mining Company operated the mines, and the Springhill and Parrsboro Coal and Railway Company built the railroad, and had it so far constructed that the

First Shipment of Coal by Rail to Parrsboro

from the mines was made on the 15th March, 1877. At that time, the Intercolonial Railway being in operation between St. John and Halifax, and a connecting line running past the mines to Parrsboro, a bright future for Springhill was anticipated by many. Some fancied they saw a city of Corinthian architecture rise on the summit of "an isthmus washed by two seas."

On opening the railway to Parrsboro an exodus to the mines from various parts of Nova Scotia commenced without delay. The forest rapidly disappeared, dwellings, churches, hotels, school houses and public halls were constructed, and in a few years Springhill appeared as a city set on a hill that cannot be hid.

The First Church at Springhill

was built by the Methodists at what is known as "Miller's Corner," on the Athol Road, and in the same vicinity James Miller opened the first hotel in the place.

The site of the present town is about one mile east of where the hotel was constructed. The first mining operations were conducted at Miller's Corner,

which doubtless accounts for the erection of buildings in that district.

The first drug store in the town was opened by Dr. Cove, who was induced to remove from River Philip in 1873. Dr. Cove was the only medical man in the place for ten years, until Dr. Byers came. He and Dr. Byers subsequently amalgamated as the colliery doctors, and have officiated together as such up to the present time.

The first store at Springhill was kept by James Hickman, in a neat frame building, erected in 1873.

Although Springhill had increased from its origin, and the prospects for the future good, yet the companies who commenced developing the mines and constructing the railroad failed to realize the large dividends on their invested capital they had anticipated. The expense connected with coal mining on "a large scale," and operating a railroad, was greater than many had contemplated. As to the company connected with the railway, they found that rolling stock was expensive and the "adjoining" coal measures were difficult to develop. Owing to small profits on the outlay, some of the stockholders got dissatisfied, and after working the collieries for ten years, sold out their claims to a company of Montreal capitalists, and retired from coal mining speculations.

The amount realized for the mines of the Springhill Mining Company, and railway from the mine to the Junction, in the interest of stockholders, was $801,250. This sum was paid on the 2nd January 1884, to Mr. Wm. E. Vroom, of St. John, secretary and treasurer of the company. Messrs. R. G. Leckie present manager of the Londonderry Iron Works and the late William Headley, who was managing Dun, Wiman & Co.'s Commercial Agency in Halifax, negotiated for the Montreal capitalists, and conducted the transfer of the mines from the Springhill Mining Company to the Montreal Company.

The Springhill and Parrsboro Coal and Railway Company transferred their interests to the Montreal Company also for a considerable less sum than the Mining Company received for their claim.

The Montreal capitalists commenced operations under favorable circumstances. New machinery was introduced and the work pushed forward with avidity. Capital was invested without stint. This company organized under the name of the

CUMBERLAND RAILWAY AND COAL COMPANY.

The present officers of the Company are: John McDougall, of the *Montreal Witness*, President; J. R. Cowans, General Manager; H. R. Drummond, Secretary, and R. H. Cooper, Cashier.

After this company took possession of the mines an extra vein of life and hope was infused into the place. New and enlarged stores were erected in the town. In some cases the low cabin gave place to a stately mansion. Small churches were enlarged, and new ones, with belfries, constructed.

In 1885-57 the Syndicate Slope was sunk on the north seam, to a depth of 2,300 feet, for the purpose of prospecting. This pit was abandoned in 1888, owing to a fire which had broken out, although successfully extinguished. The same year that this pit was abandoned another slope, known as the Aberdeen or No. 4 Slope, was sunk on the West Slope seam to a depth of 1,200 feet. The entrance to this mine is about three-quarters of a mile to the east of the East Slope.

In 1887 the output of coal at the mines netted 439,252 tons, and during the same year nearly 200 new buildings were erected in the town. The number of hands employed in 1887 at the collieries was 1,400, and the average monthly wages paid to the men was $51,000. The enormous quantity of 2,400 boxes of coal, averaging three-quarters of a ton each, was raised from the 1,300 foot levels of two of the pits in one day during that year.

Owing to the progressive nature of affairs at this

time it was considered that the town should be incorporated. The matter was agitated, and an election of the citizens to decide was held on the 31st December, 1888. The majority in favor of incorporation was fifteen. The election for mayor and town councillors was held May 2nd, 1889, and A. E. Fraser was elected

THE FIRST MAYOR OF SPRINGHILL

by acclamation. The councillors were R. H. Cooper, A. D. Ferguson, E. B. Paul, Charles Simpson, Solomon Keiver, and Fred. F. Noiles.

Mr. Fraser being the first chief magistrate of Springhill, the writer has secured his portrait, and collected a few biographical items to embody in this connection. Mr. Fraser was born in Pictou County over fifty years ago. He came to Springhill when the mines were first opened, and ever since has taken a deep interest in the progress of the town. He is of Scottish ancestry, and Presbyterian faith. His business career has been most successful. Mr. Fraser was not only elected by acclamation as first mayor of Springhill, but he was returned the second year without opposition. Previous to incorporation of the town, Mr. Fraser represented the district of Springhill in the County Council. In 1885, he was

ALEXANDER E. FRASER,
First Mayor of Springhill.

appointed a Justice of the Peace. He is an active worker in all kinds of church work.

Mr. Hall, second Mayor of Springhill, was elected February 23rd, 1891. His council is composed of E. A. Porter, A. D. Ferguson, Simon Fraser, Charles Simpson, E. B. Paul and Solomon Keiver.

The present inhabitants of Springhill number about 6,000. Notwithstanding the late disaster the prospects of the place are hopeful and inspiring. Although many who worked in the mines left after the explosion, yet others have arrived to take their places, and it is evident that the town must continue to increase for many years to come. The coal fields in the vicinity being computed at 56,000,000 tons, and the place being centrally located between Minas Basin and Northumberland Strait, with railway extension to each port, and a large surrounding country adapted for farming purposes, it has an advantage over many other flourishing inland towns.

The Springhill Mines

were never in so good condition for large output of coal than now. New engine houses for hoisting engines have lately been built at East and West Slopes. Two new dams, capable of holding 2,893,000 gallons of water, have been con-

structed, increasing the reservoir accommodation of the collieries to a capacity of 4,289,500 gallons. The travelling slope of the West Mine has been timbered from the surface to the 800 foot level, and the main and pump slopes of the same mine have been re-timbered to the bottom level. The East Slope has been re-timbered from surface to the 1,900 foot level, and another lift has been sunk from this level 600 feet, making the depth of East Slope 2,500 feet. At the East, West and North Slopes the capacity of the airways have been increased to double their former areas. A new fire-proof fan house has been built at the North Slope, and engine connected direct with the fan. The bankheads have all been newly stepped and repaired for convenience of the men getting on and off riding rakes. A new foundation has been placed under the fan at the East Slope, and the West Slope engine has been connected with fan. The number of steam boilers operating the collieries are now twenty-eight. Iron booms have been introduced into airways and pipe heads. Two new cupolas have been built. A number of mules in connection with the horses are now to work in the mine. New riding rakes for lowering and hoisting the men are in operation. New air chamber has been put on the West Slope pump. A new air

mometer has been supplied to each slope, and in the fan houses have been placed thermometers, water-gauges and barometers. Eight locomotives are in operation, and everything in and about the mines seems to indicate that an increase of business at no distant day is intended.

The Coal Measures of Springhill

are illustrated by chart in another part of this book. By looking at this chart it will be seen that these coal measures contain ten seams of coal of various thicknesses underlying each other, and separated by intervening strata averaging from thirty to three hundred feet in thickness, and all dipping to the north-west at an angle of thirty-five degrees. This chart has been prepared with great care, and is as accurate a representation of the coal seams in the vicinity of Springhill as can at present be produced. By looking at the chart the relative positions of the East and West Slopes show how they are connected by tunnel, and the place in the East Slope where the explosion occurred.

In Educational Matters

Springhill is apparently unequalled by any other coal mining district of its size. About one dozen

well trained teachers are in the place, and during the past three years $17,000 have been expended for school houses. The last school building erected cost $5,000, and was occupied for the first time on Monday, May 4th, 1891. During the past winter three night schools were largely attended by workingmen. The Local Government has provided for special courses of instruction to be imparted in mining subjects to all who desire to qualify themselves for colliery officials. These instructions and the night schools are free to all, as the government remunerates the teachers.

An industrial school is about being established in connection with the Church of England. An American lady has donated $3,500 to assist in this movement, and a suitable building will be erected without delay.

In the town of Springhill there are five churches representing Methodists, Baptists, Episcopalians, Catholics, and Presbyterians. The Salvation Army are at work constructing a large barrack in which to hold their services. A Young Men's Christian Association and a Women's Christian Temperance Union are in active operation. Other societies of all kinds are flourishing in the place.

The town has court house, jail, custom house,

hotels, and public halls with capacities for seating large audiences. The jail is a luxury, however, as it is said one policeman on duty two hours a day is able to keep the peace.

The Halifax Banking Company have a branch in the town for the accommodation of traders. The trades are all well represented in Springhill. Mercantile establishments of all kinds are evidently doing a fair business.

Among other establishments the town has newspaper and job printing offices. The paper is called *The Springhill News*. This paper has large advertising patronage and good circulation, both of which attest its popularity. It is issued Wednesdays and Saturdays, and is evidently conducted with tact. The editor is a popular young man of some ability as a writer, but as his name does not appear in the *News*, it is adjudged better not to use it in this connection. The portrait of the publisher will be seen on the following page.

Among the attractions at Springhill is

A Handsome Park.

This park was donated by Managing Director R. G. Leckie, previous to his leaving Springhill for Londonderry, to the juveniles as a play ground. The

field is on the dead level, and is fitted out with a cinder track for racing, cricket crease, and plenty of other space for amusements. It is called the "Amateur Athletic Association Grounds."

The water supply of Springhill is not what it should be. The present water for family use is obtained chiefly by rain-fall and boring. A good supply of water, it is said, could be brought from adjacent lakes. The matter is being agitated, and will no doubt soon result in something practical.

A new post office of larger dimensions than the present one is required to accommodate the increasing mail matter of the place. This will, doubtless, be constructed in time by the government.

After carefully investigating the whole surroundings and connections of Springhill, the writer's opinion is, that if the citizens are faithful to the trust the Almighty has committed to their keeping, a bright future is in store for the place.

H. A. MCKNIGHT,
Publisher *Springhill News.*

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ASTOR, LENOX AND
TILDEN FOUNDATIONS.

CHAPTER XX.

Extent of Neighboring Coal Measures.

The coal fields of Nova Scotia, Prince Edward
nd and New Brunswick are estimated by the
authorities as covering an area of 18,000 square
s, and forming one of the best bituminous coal
ons of earth. About one-half this territory is
n as including the Nova Scotia coal measures
e. The known profitable workings of these coal
sures was given by the Secretary of the Montreal
rd of Trade, in his report for the year 1872, as
g about two thousand two hundred square miles,
number of acres being one million four hundred
eight thousand, and the contents of each acre
g estimated at thirty thousand tons, the total
lable supply amounting to 42,240,000,000 tons.
Since that time prospecting has been going on,
many new discoveries have been made, so that
not too much to say that the coal measures of
a Scotia are practically inexhaustible, and repre-
a heritage of mine wealth for coming posterity
ch, perhaps, no other portion of our globe, having
same space of surface territory, can claim. A

plurality of large seams underlying each other have been found of late years in many places where it was considered twenty-five years ago small veins only existed, such as had been discovered at that time in the Springhill coal measures.

The following extracts from reports of Woodhouse and Jeffcock, mining engineers of London and Derby, England, in 1866, will support this statement: "The coal field which we have carefully examined, and which is the subject of this report, is situated in the County of Cumberland, in the Province of Nova Scotia. It is generally described as the "Springhill" coal field, but in reality it is a part of the great Cumberland coal field. The first, or upper, seam we found to be a bed of remarkably good coal. * * About 45 yards below the main seam we proved (by making a small shaft) another seam of about three feet thick of good workable coal, having the same dip and angle as the main seam. At a probable depth of 150 yards there appears to be a third seam of good coal about two feet thick. This has been partly worked, and proves to be very good."

Taking as a basis for the extent of other coal fields in Nova Scotia, this report of two of the leading mining engineers of Great Britain, regarding the extent of the "Springhill" coal measures, as

known to them twenty-five years ago, and comparing it with the facts which later investigation and practical operations have revealed, it will be seen that the majority of accounts published in cyclopedias and other standard publications are antiquated and far from the truth. This is not to be wondered at, as the coal regions in this province were not developed a quarter of a century ago as they now are. Instead of three seams of coal at Springhill, and one of them "three feet thick," and another about "two feet thick," there are actually ten seams now known to exist, and the two and three foot seams are four times the thickness stated in report. However these old reports might have served the purposes for which they were intended, it seems too bad that they should be given to the world as a true estimate of the extent of the great coal fields of the Maritime Provinces of Canada. But what makes the matter still worse is the fact that our children are taught to believe these reports as gospel truths. Were a boy attending any of our public schools in the Dominion of Canada to-day, and asked the question, "How much coal is raised in Nova Scotia annually?" if he answers according to the teachings of his "Modern School Geography," he must say, "About 600,000 tons." This he is compelled to do, or lose

a mark for improperly answering the question of his teacher. Again, studying the lesson on "Coal," given in his "Royal Reader No. 5," he is led to believe that the lesson was written by a Birmingham mechanic, who was not aware that coal had any existence outside the British Isles. In face of these notorious facts, it is high time that something should be done in the way of modernizing some of the literature used in the education of our Canadian juveniles at the present time.

The official report of the actual

NOVA SCOTIA COAL SALES IN 1871

states that 596,419 tons were disposed of that year. The total sales for 1881 are given at 1,035,014 tons, and in 1890 the amount of coal raised was 1,984,001 tons, of which 1,786,111 tons were sold. It will be seen by these reports that the figures of Nova Scotia coal productions given in the school geography are based on the amount raised twenty years ago. It is therefore not surprising that many of our young men have meagre ideas of the source of wealth imbedded in the bowels of the earth at their own doors, and leave for other climes to seek for fortunes they might obtain at home, were they properly educated as to the real value of their native heritage.

Coal has evidently now become one of the essential elements of modern civilization, and the progress of the civilization of a country is at present recorded by the amount of coal obtainable and employed by the inhabitants in a given time. The great coal fields of Nova Scotia and neighboring provinces have, therefore, not only the element of coal to insure the future greatness of this part of the empire of which they form a part, but iron and gold are in many places found in abundance, thus combining three of the most essential elements to the future greatness of any people. Add to this the great Atlantic sea-board, open at all seasons of the year, and railway extension "from ocean to ocean," for the transit of the products of the mines where these elements are discovered, and we have an assurance that nothing but disloyalty to God, our Queen and country, can hinder the future greatness of these Maritime Provinces of Canada. Owing to the sparse circulation of reliable literature bearing on the coal measures of these provinces, few are aware that one of the largest bituminous coal seams in our world is in Nova Scotia. The boasted "mammoth vein" at Wilkesbarre, Pa., is given as measuring 29½ feet in thickness, but one of the "Albion Mines" seams at Stellarton, Nova Scotia, is 37½ feet thick,

and the product of this seam is of excellent quality. The writer had the honor of travelling many miles through the underground workings of this colliery over twenty years ago, and the depth of the mine excavation from roof to bottom was given at that time as being 39 feet. An idea of the enormous quantity of coal imbedded in such a mine as this may be formed by the estimate that a thirty feet vein yields twelve millions of tons to the square mile. Of course all the seams forming the coal fields of Nova Scotia are not like the Albion Mines seam, it being an exceptionally deep formation; but many of them are from eight to twelve feet in thickness, and a large number of seams underlying each other in some of the measures.

The Sydney coal field alone extends from Mire Bay, on the east, to Cape Dauphin, on the west of that portion of Cape Breton. This tract of country covers an area of about 200 square miles. The number of coal mines opened in Cape Breton from 1858 to 1872 are given by good authority as being twenty-two, and their combined contents were estimated at about 300,000,000 of tons.

The Cumberland coal measures are also believed to be very extensive. Outside the Springhill section the place has not thoroughly been explored.

THE JOGGINS COAL BEDS

are situated on the east side of the Chignecto Bay. The main bed, called the Joggins seam, is about six feet in thickness, dipping to the south at an angle of eighteen degrees, and passing down into the beach, and under the tide. How far the coal may extend towards the shores of New Brunswick is a problem yet to be solved, but the geological condition of the strata along the shore indicate a continuance for several miles at least. Some years ago a test hole, with a diamond drill, was put down about three-fourths of a mile south of the outcropping, which penetrated the seam one thousand feet below the surface. This seam has now 1,300 and 1,900 foot levels. Extensive repairs are being made to enable operations in the most scientific manner, and a large output is anticipated at no distant day. Several other mines have been opened in the same coal beds, chiefly at River Hebert, under the names of the "Victoria," "Lawrence," "Chignecto," "Maccan," "St. George," "New York and Acadia," "Minudie," "Styles," and some others. Much prospecting has been done, and large quantities of coals have been mined with success, but the hoped for prosperity of many proprietors of the Cumberland coal measures has not as yet been fully realized. One disadvan-

tage to a more successful operation of these mines than has hitherto been reported as given by good authority is, "The want of safe anchorage for shipping, which can be protected only by expensive piers and breakwaters." This shall, no doubt, be accomplished in time. A railway is now in operation from the Intercolonial Junction to the Joggins, and the present prospect is that at no distant day coal measures in this region will be fully developed, and mining operations pushed forward with the best results.

The mines in this district, being so closely connected with the Springhill collieries, a historical sketch of their discoveries and operations in connection with the extent of each is given in the following part of this chapter. This historical material has been collected with care, and the writer trusts will be found authentic in every case.

The Joggins Mines.

About the year 1847, the General Mining Company of London, who at that time monopolized all the coal seams in Nova Scotia by right from the Duke of York, who had obtained a grant of the same from the Crown, was compelled to work this mine by reason of an agitation then in progress by

a number of gentlemen, George Young, brother of the late Judge Young, of Halifax, being the leading spirit in the movement, to have their claims set aside and the right of all minerals in the province vested in the Government of Nova Scotia, which, after a hard struggle, was accomplished.

At the time referred to, mining operations commenced under the management of Andrew Patrick, one of the first miners who came out to the Albion Mines from Scotland. A short time after the mines had started, R. B. Boggs was engaged as storekeeper and general superintendent, wharves were built, log houses erected, some clearings in the woods made, and, in a short time, the output of the mine was from forty to sixty tons per day, the company's object being to satisfy the agitation, and at the same time ship nothing that would affect the sales from the Pictou and Sydney Mines, as from these they were able to supply all demands, the work was therefore not pushed forward with vigor.

The mine was opened from the level of the wharf, and driven under the bank, which is some sixty feet high. The coals were taken from the mine by cars on a level to the vessels in the harbor, which were anchored a few rods from the entrance of the mine. The mine was self-draining for a num-

ber of years. A shaft was sunk about 200 yards from the shore, connecting with the level, and from which, after a short time, all the coal was raised to the bank by horse power, and shipped by running down the side of the shore bank on a self-acting incline plane in cars to the wharves.

At this time the only access to the mine was by water, or by a path leading through the woods from River Hebert, or around the shore. Previous to the opening of the Joggins Mine by the General Mining Company, two English miners, with their families, had been residing in the place for a number of years, raising and shipping a few small schooner loads of the coal yearly to St. John, N. B.

The place had also evidently been used as a fort by the French or other soldiers, as cannon balls and other fragments of warfare were found imbedded in the earth near the edge of the bank above the mine, and there still remained earthworks constructed to the height of three or four feet.

After the death of G. Young, through the persistency of the late Judge Young, Mr. Archibald and others, an amicable settlement was arrived at about the year 1854, part of which was that the Mining Company quit claim and cede all their right and title of all minerals to the Government, except

four square miles at the Joggins, four square miles at Springhill, four square miles at Pictou, and four square miles at Sydney, Cape Breton. These claims they retained as part consideration of yielding their rights of the Crown.

This ended a monopoly that had driven out the best class of coal miners in the country, many of whom returned and commenced operations again with success. Between 1870 and 1872 the General Mining Company sold out the Joggins property to a company of St. John merchants. The late Alex. Barnhill, of St. John, who was manager of the company, divided the property into two equal parts in geographical extent, and formed a company on each property.

One part is underlaid with the Old Joggins seam, which is 4½ feet thick. The other is known as the "Hard Scrabble" seam, which is 3½ feet thick. This mine is situated about half a mile north of the main seam, and geologically underly it. Both of these properties include a number of the smaller seams.

The company who operated the Hard Scrabble Mine, after spending a large amount of capital in building up the necessary improvements for a large output, and working the mine with apparent success for a few years, ceased operations, and the mine is

now closed. Mr. Barnhill was manager of this mine, and his son, B. Barnhill, managed the Old Joggins Mine, which continued operations under the underground management of Robert Redpath.

About half a mile from the shore a slope was driven from the surface in the coal down to and beyond the old level. This slope was worked by steam power, and the depth was increased from time to time until last fall, when it had reached 1,900 feet. The workings in this mine have all been done on the bord and pillar principle.

A new slope, about a mile from the shore, with increased appliances, was also sunk from time to time, until it is now the depth of 1,900 feet. The capacity of this mine is about five hundred tons per day. The most easterly extent of the underground workings is about one mile and three-fourths from the shore. During the past few years new companies have been formed, and the mine is now being operated on a new principle, called the long wall and waugh principle.

A railway was built from the Intercolonial to the Joggins a few years ago. It was opened for traffic in 1887.

The Victoria Mine

was discovered in 1858 by William Patrick, of Maccan, who had returned from Maryland, N. S.,

where he had been engaged as mine superintendent for some time previous to this date. Mr. Patrick's ambition was, if possible, to discover a new mine, secure the right of operating it, and make for himself an independent business. After exploring a few months, he was successful in discovering a seam at River Hebert, commenced operations and shipped the first cargo of coal raised from this mine to St. John in September of the same year.

The Victoria seams are a continuation of the old Joggins Mine, but considerably changed, the angle of dip increased, and the seam divided into three distinct seams. One of these seams is two feet nine inches, another one foot nine inches, a third two feet six inches. In 1859, Mr. Patrick sunk a slope one hundred and sixty feet deep, built a wharf, tramway, and made other improvements considered necessary to raise and ship from thirty to forty tons of coal per day. That year he shipped 3,000 tons, the profits on which paid all expenditures, including the purchase of one hundred and fifty acres of land. Encouraged by such success, Mr. Patrick was tempted to form a company, including himself, Harris & Allan, James I. Fellows, and others. Mr. Fellows moved to the mine as store and book-keeper. A new slope, two hundred

and sixty feet, was opened, steam power and oth requisites essential to an increase of business we introduced after formation of the company, and th business continued to grow. Conflictions with som of the stockholders, however, prompted Mr. Patrick to sell out his interest, and retire from the company which he had been induced to organize. After the retirement of Mr. Patrick from the company his place of management was taken by a Mr. Simmons, an English gentleman, who, it is said, induced the company to abandon the slope and sink a perpendicular shaft down through the rock to the level of the slope bottom. After the shaft had been opened, the company operated the mine only a few years longer, and then closed operations, which, as yet, have not been resumed.

The Lawrence Mine

Company's operations were commenced some years after the Victoria. This mine is situate about half a mile east from Victoria Wharf. The seams are the same. Their works were along near the outcropping. This mine was self-draining, and was manipulated from the north side of the Victoria property. The company was formed of Boston men through the instrumentality of the late George

Hebert and others. They spent considerable capital in wharf building, tramway, miners' houses, etc. They shipped coal for a few years, when their underground work, about half a mile in extent, were interrupted by a fault dislocating or cutting off the coal altogether. It is not yet known whether the Joggins seam extends any further east. Much time and money have been spent, especially in Maccan district, to trace it, but without avail. This mine is now silent.

The Maccan Mine

Was discovered and opened in the spring of 1861 by Wm. Patrick. It is situated about one mile west of Maccan River. The most northerly or underlying seam is a continuance of the Hard Scrabble seam. The top seam crops 460 feet south of the other, and is two feet thick, and of superior quality for domestic use. This seam was not supposed to exist. These seams dip at an angle of 30 degrees. The first year of operation Mr. Patrick raised some coal for local trade, and shipped a few cargoes from the two foot seams. The following year he sold the mine to Howe & White, of Boston, and in June, 1863, a company was formed of Boston men, called the Maccan Company.

After disposing of this mine Mr. Patrick commenced a slope on the Hard Scrabble seam, intending to sink 2,000 feet for a contemplated large business, then connect the two foot seam by tunneling at the bottom, so that both seams could be operated with the same plant, etc. However, these connections were never made. The Maccan Company imported experts and geologists from New York, who considered that the Hard Serabble seam was on the property, but yet to be found. Owing to this matter, plans of operations were changed. A temporary shaft was sunk and slope extended to the depth of one hundred and forty feet on the small vein.

This company built wharves, tramways, miners' houses, etc., and engaged a large number of men working the mine and exploring under the geologist's directions. A steam tug was purchased in New York at a cost of about $15,000 to tow the vessels in the river. The coal raised and shipped was from 60 to 70 tons per day. Horse power was used for two years or more, when preparations were made for steam power, but before the machinery was started the whole business had collapsed. The company, it is said, spent some $70,000 in reckless expenditure. Since stopping operations the mine was idle until a few years ago, when it was pur-

hased by T. R. Smith, of Amherst, who is now perating the two foot seam, and raising about enty tons of coal daily.

THE CHIGNECTO AND ST. GEORGE MINES

re discovered in the summer of 1863 by William trick. These were found to be the most difficult d costly mines to discover that had been under-ken, they being thrown by faulting about half a le out of their supposed position. The St. George am was tapped first about four miles east from accan, and afterwards the Chignecto, the same am on the bank of a brook which empties into accan River, affording excellent facilities for rail-ay to the river and wharves, which were built for ipping purposes afterwards, three and a quarter iles from the mine. These seams are a continu-ion of Hard Scrabble and other small seams above on the shore. By coming together here they rm a seam thirteen feet in thickness, and dip at angle of forty-five degrees. Mr. Patrick sold is property to John Babson and others, of Boston, ho divided the property and formed two com-nies. The Chignecto they wished to be pressed rward as rapidly as possible. Owing to the merican Rebellion, coal was then selling in the astern States at thirteen and fourteen dollars,

American currency, per ton. The plant and improvements for Chignecto cost about $45,000. The first shipment of coal was made in the fall of 1864, and the result was so encouraging that the following year about fifteen thousand tons were shipped at a heavy loss, as the rebellion was ended and coal soon fell in price to five and six dollars per ton, American paper, which was only worth sixty cents gold on the dollar, and a duty of $1.50 gold on the coal was imposed.

As all shipping could only be continued through the summer at such low prices, the coal had to be stored for winter sales. When returns were all in, the company found that, after paying freight, commissions, storage, duty, discounts, etc., they had only twelve cents per ton left for mining and delivery of coal on board of vessels. The actual loss was about $1.25 per ton on all coal shipped to the States. This same condition of things affected all the other Nova Scotia coal dealers then shipping to the States in a similar way.

The works on St. George in the meantime had progressed to the extent of slope finished, house, railway connection with Chignecto Road Junction about one mile and a half below St. George, and three-quarters of a mile below Chignecto. The rail from 22 to 24 lbs. per yard, imported from Eng

hand, were used on both. Mine cars, etc., were procured. Expenditure, about $25,000.

There was but a beginning made to ship from St. George when frost closed navigation, and mining operations closed at both mines. However, the properties were cared for, and some time after the two companies amalgamated and called themselves the "Cumberland Coal Mining Company," but did nothing more, and sold out to the Acadia Iron Company in 1881 for $45,000. By this time, the Intercolonial being in operation — they never used the old tramway — took up the light rails, laid heavy rails and gauge corresponding to the Intercolonial from Chignecto Junction to Maccan Station. They also secured a small locomotive, and erected one of the most elaborate bank and hoisting apparatus in the Province, in connection with other improvements, the whole costing, it is said, about $75,000. A fire in the mine last year compelled the owners to let it fill with water. The official report in reference to this Chignecto Mine for 1890 states:

"This mine worked on in the usual way until July, when most of the men were dismissed. Some nineteen or twenty were, however, retained prospecting until late in the fall, when Mr. Frank Burrows, Underground Manager, took these men and began taking out coal along the crop-out on the eastern

side of these works, and, as it can be got water-dry, the idea is to keep these men employed for the winter months in readiness for prospecting in the spring."

The Minudie Mine

was opened about the year 1866. John Anderson and S. Smith opened this mine on River Hebert, about one-third of a mile north of Victoria Mine. After working the mine for some time they sold it to the late George Hebert and others, who formed the Minudie Coal Company. They equipped the mine for raising and shipping at considerable outlay. They shipped coal by water for a number of years, but finally suspended operations, except what they raised above water level for local consumption. The seam of coal is about three feet nine inches in thickness, of superior quality, with about eighteen inches to two feet of fire clay in the middle. Its identity seems, with many, to be doubtful, but it is supposed to be the Baie seam on the shore enlarged here. The seam is opened on the west side of the river opposite, but reduced somewhat in thickness, and is owned by William Milner, of Sackville. It is not being worked. There has been some coal taken from it, but never been fitted up to do anything of importance. About twelve men were

employed operating it last fall, according to official report.

THE STYLES MINE

is situate about four miles east from Chignecto, and is the most easterly development on this side of the Basin. It is a continuance of Chignecto seam somewhat changed, but not for the better—angle of dip increased to forty-five and fifty degrees. It was opened in 1865 by John Robinson, of Pictou. It is owned by James Hickman and others, of Amherst. There has been considerable spent in test slopes, etc., but no substantial operations were ever entered into. Between St. George and the Styles mines, the heirs of the late Sir Albert Smith, of Dorchester, and Blyght, of Hillsboro, N. B., own a property, on which is opened the same seam, but on which nothing more than a test slope, opened a few years ago, has been attempted.

THE AMHERST COAL MINING COMPANY'S MINE

is situated about two miles east from River Hebert, and two miles west from Maccan. This property had been held, by right from the Government, by James Hickman and others for many years; but when their right expired Mr. Patrick secured a lease, and with moderate expense developed three seams. After sinking test slopes and pits he sold

one-half interest in Halifax, and in time bought back a quarter, thus holding three-fourths interest in the property, and by the time the Joggins Railway was open he had secured a market at remunerative prices on board of cars at the mine for all the coal he could raise. The mine plant, which cost $12,000, was all complete, and operations were pushed forward until November, 1887, when, during the night, the whole place was destroyed by fire, and, having no insurance on the property, Mr. Patrick was unable to make the necessary repairs in order to continue operations at this mine.

From this historical outline of the hitherto career of coal mining in Cumberland County, the reader will be able to see that the experiences of many who have engaged in developing the mines in this section of Nova Scotia have been checkered, and some of them even romantic.

Notwithstanding so many failures to secure colossal fortunes anticipated by some coal mining speculators in Cumberland, future explorations may reveal something surpassing anything that has yet been discovered. Geologists say an abundance of coal is here imbedded, and indications correspond, but it will, no doubt, require time and capital to secure it.

CHAPTER XXI.

Coal and its History.

No more profitable or interesting study could be engaged in than that of coal and its history. In looking at so common an object as coal many might think it impertinent to make any inquiry after it further than where it might be purchased at the lowest rates. But when we investigate its real properties and value, and candidly consider what our world would be to-day without its use, it becomes at once an object of our greatest admiration and regard.

"Who can sum up the benefits we derive from coal?" says a distinguished writer. "It warms and lights our dwellings, cooks our food, illuminates our streets; coal develops and sustains the force which propels the locomotive along the railway, and the ship across the sea; works the printing press, wields the hammer, lifts the weight, draws the load, moves the machinery, grinds the corn, spins the cotton, weaves the cloth, pumps the mine, deepens the river, covers the land with a network of railways, forges the electric wire, and, submerging the ocean

telegraph, 'Will put a girdle round about the earth in forty minutes.' Who shall set bounds to the power of coal, iron, and steam?"

What is Coal?

Was it made as it now is, or transformed from another substance? If changed from what it was to what it is, how has the change been effected; and how came it into the places where we now find it? are honest questions which every thinking mind has a right to ask and use all lawful endeavors to solve. Many theories regarding the mode of the origin of coal have been set forth since its discovery until the present time, but these theories have all been, more or less, fraught with difficulties. The great barrier in the way of universal acceptance of any theory is, doubtless, owing to the fact that the early history of our globe still remains one of the great unsettled problems of geology. Although Geikie and other renowned geological professors come forward in their science primers telling us how the whole arrangement was executed, as if they were eye-witnesses, yet many are slow to believe what they cannot easily comprehend, and the matter must necessarily remain in mystery to some.

An Irishman, giving his opinion of a coal seam, would naturally suggest that a peat-bog had run away and got into a worm-hole of the earth. Among all the ideas advanced on the subject, the following is, perhaps,

THE MOST GENERALLY ACCEPTED THEORY

set forth as to the mode of the origin and deposit of coal: That the rank and luxurious vegetation which is supposed to have prevailed during what geologists call the carboniferous age, grew and decayed upon land but slightly raised above the sea; that by slow subsidence this thick layer of vegetable matter sunk below the water, and became gradually covered with sand, mud, and other mineral sediment, that then, by some slight upheaval of the sea bottom, or other process, a land surface was once more formed, and covered with a dense mass of plants, which, in course of time, decayed, sank, and became overlaid with silt and sand as before, thus forming a second, third, fourth or fifth strata, as the case might be, which, in due time, as a matter of course, all became deposited in the earth. At length these thick masses of stratified matter, when accumulated, would produce great pressure, and this, acting along with chemical changes, would greatly mineralize the vegetable layers into coal.

This theory seems plausible, and harmonizes with the "dip" of a plurality of seams, such as is found at Springhill; but still there is a mystery about it that is hard to solve. So far as the product of the mine is concerned, the evidence is overwhelming that

COAL IS OF VEGETABLE ORIGIN,

apparently once in a liquid state, and has connected with it a history of intense interest, which is worthy of occupying our sincere thoughts; but through what process of operation it has passed in formation, and how it got into some of the places where we now find it, are apparently mysteries that may never be solved. Scientific research has undoubtedly unfolded a world of mystery in connection with the mine; but greater developments shall, no doubt, yet be made through painstaking investigation.

In the study of geological science many years ago, the question relating to the history of coal became a prominent one. It was supposed at first that coal was a mere mineral product, such as iron, gold, silver, etc. But in due time the idea that it might have had a vegetable origin dawned upon the minds of some thoughtful men, and by thorough investigation the doctrine of the vegetable origin of coal was established, and is now generally accepted by the

scientific public. Regarding the process of formation and mode of deposit there must necessarily remain some conjecture until convincing proof is brought to bear upon the subject, such as that furnished in the case of the vegetable origin theory.

In justification of the idea that coal was of mineral product, one might say that at first sight it is hard to believe that the hard, stony substance coal should have anything in common with wood, except that they both burn easily. It is only when subjected to chemical examination, by means of a retort, that they are found to yield similar products, and differ chiefly in the amount of oxygen which each contain, and in the smaller bulk into which coal has been compressed.

The Great Value of Coal over Wood

arises from its power of producing a great amount of heat from a small bulk in a short space of time. It is wonderful the amount of heat that a small portion of coal, set in a good draught, will produce, and it can be measured by the warmth it will impart to a kettle of cold water placed over it.

It is found that this heat is produced by the burning of the gases of the coal in the air of the atmosphere, and by the capacity for retaining heat

which the solid part of the coal possesses. The great heat derived from coal over wood is owing to the extra amount of carbon contained in the coal.

According to Prof. Ruscoe's *Manual on Chemistry*, wood fibre contains a fraction over 5½ per cent. of carbon and anthracite, or hard coal 94 per cent., and soft or bituminous coal 86 per cent. The following table by Ruscoe gives the chemical composition of the several objects named in it, exclusive of the ash left by combustion:

	Hydrogen.	Carbon.	Oxygen and Nitrogen.
Wood Fibre, ...	5.25	52.65	42.10
Irish Turf, ...	5.88	60.02	34.10
Cologne Lignite, ...	5.25	66.96	27.76
Wigan Cannel, ...	5.85	85.81	8.34
Newcastle Hartley, ...	5.61	88.42	5.97
Welsh Anthracite, ...	3.38	94.05	2.57

It is also discovered that if a piece of coal were placed in the bowl of a pipe covered with clay, and placed in a fire with the stem of the pipe exposed, some steam will come off, and afterwards strong smelling gas, which can be collected by allowing it to bubble up through water into a vial full of water turned upside down. After all the gas has escaped from the coal, by examining the bowl of the pipe, coke instead of the coal will be found, thus proving

that coal consists chiefly of gas and coke, which, by investigation, will be found of vegetable production.

The Whole Family of Coal

are divided into two primary divisions; namely, Anthracite and Bituminous. The former is known as the hard coal and the latter is termed soft. There are various degrees of quality of these coals, according to their location and deposit. The anthracite coal is found in regions where the strata have been disturbed by volcanic eruptions, or subjected to heat by local causes, and hence the great abundance of carbon, and lack of the two gases, oxygen and nitrogen, which form our atmosphere, these having escaped by interruption. The lack of hydrogen, which forms the blazing property of the pit or bituminous coal, which is dug from the mine far beneath the surface, is owing to its being securely incased in the rock strata, thus preserving its original gases to a greater degree.

Whatever coal now is, it appears to the writer that it once might have been of similar material to that comprising

The Peat-Bogs of Ireland.

In fact, there is such a similarity between peat and coal that one familiar with both is forced to conclude

that a peat-bog is a coal mine in embryo. On this point the writer can speak from experience, having spent a short time in a coal mine, and many years in a peat-bog.

Many may feel inclined to laugh at this idea, but those grand old bogs of Erin are as wonderful in their formation and variety of material as the most renowned coal mines of earth. Peat may be found bearing as much resemblance to coal as an African does to a negro. Peat can also be found in the same bog presenting the hue of an Indian, and in close proximity another portion as pale faced and useless as a modern novel reader of fashion.

Now, how can we account for this? My observation is that peat found at the bottom of the bed, where it has long been subjected to heat and pressure, is the peat resembling coal, and has a greater or less likeness, according to the amount of heat and pressure that has been brought to bear upon it; whilst that at the surface, exposed to cold, and having had no pressure, is the light colored, and of little value, portion.

Although this peat-bog theory may be scouted by many as a fancy of the brain, yet it bears the stamp of reason, and is worthy of the deepest consideration. Those who know anything about what

a peat-bog really is, in its rude state, are aware that it is as natural for its floating portion to descend into the interior of the earth, were an opening formed for its escape, as a duck to take to water.

The writer can bear testimony to a portion of one of these old bogs, which got afloat and could not find an underground channel, take its departure with velocipede force across the country, overwhelming everything in its course, until it found a lodgment in the River Main. This wonderful bog was formerly called "Slogon Moss," but is now known as

"The Moving Bog."

The situation of this bog is in the County Antrim, Ireland, a few miles north of Lough Neagh. The rash movement of this bog took place in the fall about the year 1883, and was considered by some as one of "the seven wonders of the world," and thousands not only flocked from all parts of the British Isles to see its manœuvres, but dates were then fixed for future reference, and it was quite common for a mother to tell the age of her son by stating that he was born one, two, or three years before or after "the moving bog," as the case might be. Did space permit, much might be stated about this mysterious bog, a sample of which may now be

forming into coal in some of the deep crevices of the earth, into which it entered at the time of its departure from its former site; but enough has been stated to show that the "peat-bog theory" is worthy of more consideration than has yet been given to it by geologists, many of whom have had no practical knowledge of what a genuine peat-bog really is.

The American Cyclopedia, edited by Ripley and Dana, referring to the "peat-bog theory," says: "The formation of peat is generally little known or understood. Few works have been published on the subject, and as bogs are generally of difficult and even dangerous access, they are rarely examined carefully enough to obtain full evidence as to the details of their formation. And furthermore, this study demands a knowledge of botany and chemistry rarely attainable by the student before the years of his strength for field explorations are passed." The same authority states: "Not a single case has been recorded in regard to the formation of coal which cannot find its counterpart and its explanation in some of the phenomena attending the present formation of peat."

Taking it for granted, therefore, that peat and coal are of the same material, and that the former requires only time and circumstances in order to

become coal such as we now find imbedded in the mine, what a manifestation it gives us of the wisdom, goodness, and foreknowledge of God, in storing up this

RESERVE OF THE OLD FOREST,

now to be dug up by man and used in his service as fuel, when the great forests, which have hitherto been used for the same purpose, are rapidly disappearing from the earth.

Although the secular scientist may not be able to see anything farther than a development of nature in this wonderful formation, the devout Christian can trace the handiwork of the Almighty therein, and feel assured that

"Deep in unfathomable mines
Of never failing skill,
He treasures up His bright designs,
And works His sovereign will."

It is man's duty and province to investigate, and Christianity has nothing to fear from the most scrutinizing investigation of all God's works, but on the contrary. "Seek and ye shall find, knock and it shall be opened unto you," are the words of Jehovah, and they apply, doubtless, as fully to the wonders

of His material works as to the mysteries of His revealed word.

Whether we are prepared to receive or reject the vegetable theory set forth regarding the formation of coal, we cannot possibly deny that everything in nature is subject to change. We never see anything that has always been exactly what it is when our eyes rest upon it. It has, in every instance, once been something from what it is now, and the attempt to follow the changes it has undergone, and the causes that produced those changes, could not fail to produce a measure of interest in the mind of every intelligent being.

If we accept it as a cardinal truth that man's body was formed of earthly dust previous to its animation by the breath of God, why should we doubt that coal was made by the same Almighty hand from suitable material when we have the

STRONGEST EVIDENCE POSSIBLE

that such is the case? And although unable to trace the different stages through which coal as it is now found must have passed, we should rest assured that an all-wise Providence, operating through natural causes, has produced this most wonderful substance of the mine.

Our duty is, therefore, to receive this bountiful gift of God with gratitude and reverence, and try to realize its true value and beauty, however difficult it may be to obtain, or however uncomely it may appear to be. And then, as we study the forces which the Almighty has employed as His instruments in developing this mysterious product of the mine, our reverence will inevitably rise to Him who is the source of all power, wisdom and goodness, and who alone is able to control the most stubborn elements of nature, so that they might become subservant to his infinite purpose and will.

The First Discovery of Coal

is not on record, nor is it known at what time it began to be used as fuel. The word "coal" is often mentioned in the Bible and other ancient books, but Dr. Smith, in his Dictionary of the Bible, states that the coal mentioned in the Scriptures represents no less than five different Hebrew words, and that the fire of coals referred to were "probable charcoal, and not coal in our sense of the word."

However, some believe that the ancients had a knowledge of its use, and to prove this idea a passage from a treatise on stones by Theophrastus, a pupil of Aristotle, and for many years the head of the

peripatetic school of philosophy, is quoted. This record was dated about three hundred years before the Christian Era, and states:

"Those substance that are called coals, and are broken for use, are earthy, but they kindle and burn like wooden coals. They are found in Liguria, where there is amber, and in Elis, over the mountains towards Olymphus. They are used by the smiths."

Cinder heaps, found among ruins of the time of the Roman supremacy in Britain, indicate that coal had to some extent at least been used by the people of that age, but history being silent on the subject, we are left to conjecture. During the Anglo-Saxon period, however, it is recorded that in that year twelve cart-loads of "fossil coal," or "pit coal," were received by the Abbey of Peterborough, in England.

It is believed that England was the first European country in which coal was used to any extent, and that coal began to be systematically mined in Great Britain about 1180. In this year the Bishop of Durham granted several leases for mining "pit coal." The coal of Belgium was also developed about the same time, or during the twelfth century, near Liege.

COAL WAS FIRST USED IN LONDON,

it is believed, in 1240, but chiefly in the arts and manufactures, and was soon considered an innovation, injurious to health. In 1300 considerable quantities were made use of, and in 1316 the parliament petitioned the King, Edward II., to prohibit its use in the City of London. In order to render the prohibition effectual, an act, it is said, was passed "making it a capital offence to burn the dreadful stuff."

Notwithstanding this stern decree, the coal industry had commenced and was bound to flourish, and, owing to the scarcity and high price of wood, the use of coal soon became general, and in due time became one of the great sources of national wealth.

COAL WAS MINED IN SCOTLAND,

it is said, in the twelfth century and in Germany a hundred years afterwards, and the Chinese are believed to have been familiar with its use at that time.

Owing to a similar prejudice against coal in Paris to that in London, its use in that city as a household fuel amounted to little until the middle of the sixteenth century. "This was also the date

of its introduction into Wales, Belgium, and other European countries."

The First Coal Discovery in America

was made in 1679 by a French explorer named Father Hennapin, near the present town of Ottawa, Illinois. It is supposed that coal was discovered and mined near Richmond, in the State of Virginia, as early as 1750, "but by whom and under what circumstances the discovery was made we have only tradition to inform us." It is said that a small boy, searching for crowfish with which to bait his hook, chanced to stumble upon the outcrop of a coal-bed which crosses the James River about twelve miles above Richmond. After this discovery was made known, further examination disclosed a field of rich bituminous coal, covering an area of about one hundred and eighty square miles. Mining operations were immediately commenced, and by the year 1775 the coal was in general use in the vicinity for domestic and smithing purposes. It is asserted that the cannon balls which were used to kill the English, during the war for independence, were manufactured by the use of this coal, and that, by 1789, it was being shipped to Boston, New York, and Philadelphia.

The systematical mining of coal, it is said, commenced in the regions of the Susquehanna River and Pennsylvania about the year 1785. A lease, yet in existence, dated April 11, 1767, making a grant of land on "Coal Pit Creek" (now Pittsburg), states that there were coal openings there at that date. But the first coal sent from Pittsburg to an eastern market was shipped to Philadelphia in 1803. It was carried by a vessel of three hundred and fifty tons burden, called the "Louisiana," and was sold for thirty-seven and a half cents per bushel.

From this time the mining of bituminous coal in various parts of the country was carried on with vigor and success. But what constitutes the

GREATEST EVENT IN THE HISTORY OF COAL

was the discovery of the "Stone Coal," or Anthracite, in the Valley of Wyoming, Pennsylvania, in the year 1762. This valley was settled in that year by enterprising Yankees from Connecticut, who made the discovery immediately after reaching the valley. But, alas! these never before defeated "Yankee settlers" could not make their coal burn. They tried it again and again, but repeated trials met with repeated failures. A blacksmith, named Obadiah Gore, was among them, however, and his faith in

the mineral was undying. After pondering over the matter for seven years, in 1769 this blacksmith took a quantity of these coals to his shop, arranged them in his forge, and persevered in trying to kindle them, until finally the black lumps yielded to his persistency, and his efforts were rewarded by seeing the blue flame dart forth and the red color creep over them, and of feeling the intense heat sent out of their combustion by the strong air-current sent through them by the bellows.

As this Yankee blacksmith was the first white man to practically demonstrate the value of hard coal as a fuel, he was rewarded by an appointment as one of the associate judges of the courts of Luzerne County.

THE FAME OF THE NEW FUEL

spread like wildfire, and in a short time every smithy in the surrounding region were ablaze with anthracite. Notwithstanding all the "puffing" it got in the neighborhood of its discovery, it was looked upon by outsiders with suspicion as a "Yankee humbug."

The same kind of fuel was soon afterwards discovered in other parts of the state, chiefly by the accident of some hunter coming in contact with its

outcrop; but it was not until twenty-six years after Obadiah Gore's experiments that it was burned to any extent with success. All the Yankee schemes that could be invented to make it burn in grates were tried to no purpose. Among other inventions "it was proposed to force air through a tube to the under part of the grate by means of clock-work operated by a weight or spring." But all efforts made to burn the "stone coal" proved miserable failures. As late as 1812 one named Colonel Shoemaker raised several wagon loads of coal in the Schuylkill region, which he took to Philadelphia, and sounded its praises so highly that he disposed of a few small quantities for trial. The trial, as usual, proved to be unsuccessful, and the people who had purchased the coals, believing they had been victimized, denounced the colonel as a cheat and a swindler, while one person, whose wrath rose to a high pitch, procured a warrant for the colonel's arrest on the charge that he was a "common impostor." The colonel, hearing of the grumbling about his coal, left the city with all haste and drove, it is said, thirty miles out of his way to escape the terrors of the law. This was only one experience among many of those who at first attempted to introduce anthracite as a fuel. However, the diffi-

culty to make the "stone coal" burn was overcome after a dreadful effort made in 1814 by the firm of White & Hazard, iron wire manufacturers, at Schuylkill Falls.

Having decided to test the qualities of the anthracite they bought a cart load of it, paying one dollar a bushel, and commenced operations to get a fire started with it in their furnace. In time the entire load was wasted, but the fire did not burn. Another load was procured, and the whole crew determined to spend the night, if need be, in getting up a fire. The night was spent in the attempt, but in vain. They had punched, and raked, and poked, and after every possible attempt of manipulation had failed, the men, being disgusted and discouraged, slammed the furnace doors and left the mill in despair. About an hour afterwards one of the men returned and discovered that the furnace door was red-hot, and in great surprise he flung the door open and found the interior glowing with intense heat. All hands were soon to work, and it was soon evident that the way to get a good fire from the "stone coal" was merely to start it properly with wood and then let it alone. This discovery was the great starting point to the general use of the celebrated anthracite coal on this continent.

THE FIRST COAL MINING IN CANADA,

so far as the writer has been able to ascertain, was made on the north side of Cow Bay, Cape Breton, in 1720, and the coals were used to supply the workmen who were then laying the great fortress of Louisburg, which the French erected on the south-east shore of the island, at a cost of 30,000,000 livres.

Three years after England had taken possession of the island, in 1766, Peter Bard, William Lloyd, Benjamin Gerrish and James Armstrong, merchants of Halifax, opened a mine at Sydney, paying four hundred pounds sterling for the privilege of raising three thousand chaldrons of coal, and were compelled by their contract to send half the quantity mined to Halifax, and dispose of it at twenty-six shillings sterling per chaldron.

The next record of coal mining in Cape Breton was in 1784, by Lieutenant-Col. Desbarres, who was appointed Governor of the island that year. This coal was disposed of at eleven shillings and sixpence a ton.

In 1788, the Governor who succeeded Desbarres recommended that the mines be leased to Thomas Huxley. Huxley secured the lease, and the Governor was paid three shillings and sixpence for every

ton of coal mined under the lease. This royalty was abolished in 1792 by the Secretary of State.

From this date mining operations in Cape Breton were continued with increasing yearly output. The quantity raised from 1822 to 1826, inclusive, was nearly 7,500 tons; and in 1872 it had reached 383,343½ tons, which were mined that year in the island.

First Coal Discovery in Pictou County

was made by Rev. Dr. McGregor, the pioneer Presbyterian minister, who arrived at Halifax, from Greenock, on the 11th July, 1786. Dr. McGregor discovered the coal on his own farm in 1798, had a fire of it burning to entertain the candidates at the election of 1799, and commenced mining operations chiefly for his own use in 1801.

Other mines in Pictou County were opened during the next few years, and coal was raised in small quantities until the year 1827, when an English company, known as the

General Mining Association,

who had secured the right of working all mines in the province with the exception of a few old grants, sent their agents, who arrived at Pictou in June

of that year, in a vessel containing machinery, mining implements, colliers, mechanics and engineers. This company commenced operations at the East River. Their first coal was raised on the 6th September, and by the 7th December an engine of twenty horse power was in full operation at what was afterwards known as the "Albion Mines." With this incident commenced coal mining operations in real earnest in various parts of Nova Scotia.

CHAPTER XXII.

Mysteries of the Mine.

Those who have not been in a coal mine have no idea of what mysterious sights are to be seen in this gloomy inclosure, notwithstanding the hazy atmosphere and absence of daylight. The first tour of anyone through a coal mine in active operation cannot fail to be prolific of strange sights and sounds and of novel sensations, which shall not soon be forgotten. To this the writer can testify, having explored the regions of the collieries at Springhill and Stellarton.

Although the mysterious attractions of a coal-pit are surpassingly great, yet it is the last place any one should think of visiting for the purpose of "sight-seeing." To those who have never been in a coal mine, the

Sensations of Going Down the Entrance

are wonderfully strange. After getting fairly started on the downward grade, all the stories one has ever heard about the rope breaking, and other coal mine disasters, seem to flash upon the mind, making the

impression that you are probably going down to stay. If you enter the mine by a shaft, as the writer did at Stellarton, the first momentous experience will be the descent on the cage. At this stage of the journey, although under the protecting care of a trusty guide, without whose presence you would not be allowed to descend, your nervous system fails to serve the purpose for which it was made.

Having inquired the depth of the pit, as you set your foot on the safety carriage at the head of the shaft, it swings slightly, but enough to make you realize that you stand on critical ground, there being nothing but a few inches of board, suspended by a rope, between you and the bottom of the mine, which is fully one thousand feet in the distance below. Equipped with Sir Humphrey Davies' safety lamp, when all is ready your guide cries: "Slack off!" The engineer, having heard the signal, sets his machine in motion. The cage is slightly raised, and then begins to descend at a rapid rate. Your first sensation is that of falling. It seems as if that on which you were standing has gone from beneath your feet, and you attempt to grasp for something above your head. As you are endeavoring to do this, it seems as though the motion of the cage had reversed, and you were

moving rapidly on the up grade. During the short time occupied in the descent, your sensations are varied, until you feel the motion become slower and your platform gently strike against the bottom of the shaft, where you step off the "stage of light" into a world of darkness, and stand confounded, awaiting coming events. On

ENTERING THE MINE BY A SLOPE,

as the writer did at Springhill, your experience will be different, however, although no less novel. Here you go by rail, and will find yourself, with one or two companions, seated in a rude carriage, operated by machinery, descending a grade like the Falls of Niagara at the rate of sixty miles an hour, into a hole in the earth two thousand feet deep, and at the bottom walking out into a gloomy cave,

"Without a gleam from moon or star
To tell the wanderers where they are."

Your situation on reaching the mine by shaft or slope will be the same in either case. You will find yourself in a new world from that you left a few minutes before, and surrounded with objects you never dreamt of coming in contact with. The luminary you hold in your hand, although unable to

enlighten your understanding, is quite sufficient to make the surrounding darkness visible, and forcing the expression, "How great is that darkness!" The first impression made upon the mind, as the eye tries to penetrate the dismal vista, is that no other darkness could for a moment compare with that which you now behold. You realize that it is not only darkness, but blackness and darkness combined. That the ninth plague of Egypt was "darkness that may be felt," you remember, is on Sacred record, but here you are able to believe is darkness that no one could help but feel.

As your eyes become accustomed to the situation, by the aid of your lamp, you discern the rough walls of solid coal near where you stand, the moist, flat, black roof overhead, and the mine car rail-tracks at your feet. All around you is confusion in this section of the pit. Cars loaded and empty are here passing and repassing in quick succession, and your guide has all he can do to keep you from being run over.

You start on a tour of inspection, and the first object you will probably meet is a man whose lamp has gone out, forcibly illustrating the situation of the foolish virgins referred to in the parable, and warning you to beware of having your lamp extin-

guished. As you go forward the whole surroundings are calculated to inspire a deep sense of

AWE AND SOLEMNITY.

You fancy a drop of water falling from the roof melancholy in its tone. Distant rumblings, sepulchral voices, human beings with flaming foreheads and spectre-like visage, clattering hoofs, and other unique surroundings, are more than convincing that if this place is not the abode of "the angels which kept not their first estate," it certainly is not the paradise of the righteous, or land of Beulah, where Bunyan's pilgrims longed to dwell. In such solitude you find it hard to restrain the conviction that Heman must have penned the 88th Psalm in a coal-pit.

Notwithstanding all this, and the essential darkness that prevails, there is a ray of hope to cheer the heart and encourage exploration in the *assurance* that the footprints of the Almighty is here, and that you are now enabled to see, although dimly, with your eyes what you had only read in story—"The Wonders of the Mine"—and feel assured that one-half had not been told.

As you proceed, the body of a horse looms up ahead of you, and a swarthy face, made visible by

the flame of a lamp placed on the brow, gleams out of the darkness, but no body is visible, being in deep shadow. Brawny, bare arms become visible, but immediately disappear in the darkness. You hear the strange sounds of men's voices, and fancy a waterfall is somewhere in the neighborhood of where you are. In passing along

THROUGH THE DARK CORRIDORS

you experience a sense of confinement, and must often crowd against the rib in order to allow a trip of mine cars, drawn by a horse, in charge of a boy, with dim clothes and soiled face, to move past.

When walking up an incline plane, or through a connecting tunnel, you are sometimes compelled to stoop, that your head might be saved from coming in contact with the "ceiling." All the men you meet have little lamps in their caps, smoking and flaring in the strong air current. The soiled faces of these persons are about all of them that you can distinguish. You occasionally come to a door, and the little "trapper" boy, who stands ready, pulls it open for you and your guide to pass through. A strong current of air nearly extinguishes your lamp as the door behind you closes. "You walk along

the airway for a little distance, and then you come to the foot of a chamber. Up somewhere in the darkness, apparently far away, you see lights twinkling—four of them. They appear and disappear; they bob up and down; they waver from side to side, till you wonder what strange contortions the people who carry them must be going through to give them such erratic movements. By-and-bye there is a cry of 'Fire!' The cry is repeated several times; three lights move down the chamber toward you and suddenly disappear; then the fourth one approaches, apparently with more action, and disappears also. The men who carry them have hidden behind pillars. You wait, one, two, three minutes, looking into darkness. Then there is a sudden, wave-like movement in the air; it strikes your face; you feel it in your ears; the flame of your lamp is blown aside. Immediately there is

THE SOUND OF AN EXPLOSION

and the crash of falling blocks of coal. The waves of disturbed air still touch your face gently. Soon the lights reappear, all four of them, and advance towards the face. In a minute they are swallowed up in the powder smoke that has rolled out from the

blast; you see only a faint blur, and their movements are indistinct. But when the smoke has reached and passed you, the air is clearer again, and the lights twinkle and dance as merrily as they did before the blast was fired. Now you go up the chamber, taking care not to stumble over the high caps, into the notches of which the rails of the car track are laid. On one side of you is a wall, built up with pieces of slate and bony coal and the refuse of the mine; on the other you can reach out your hand and touch the heavy wooden props that support the roof, and beyond the props there is darkness, or if the rib of coal is visible it is barely distinct. Up at the face there is a scene of great activity. Bare-armed men, without coat or vest, are working with bar, and pick, and shovel, moving the fallen coal from the face, breaking it, loading it into the mine car which stands near by. The miners are at the face prying down loose pieces of coal. One takes his lamp in his hand and flashes its light along the black, broken, shining surface, deciding upon the best point to begin the next drill hole, discussing the matter with his companions, giving quick orders to the laborers, acting with energy and a will. He takes up his drill, runs his fingers across the edge of it professionally, balances it in his hands, and

strikes a certain point on the face with it, turning it slightly at each stroke. He has taken his position, lying on his side perhaps, and then begins the regular tap, tap of the drill into the coal. The laborers have loaded the mine car, removed the block from the wheel, and now hold back on it as it moves by gravity down the chamber to the gangway. You may follow it out, watch the driver boy as he attaches it to his trip, and go with him to the foot of the shaft" or slope if desired. But if you wish to explore still further, you can examine the mechanical operations of the mine; or, if more desirable, you can look into the mysteries of coal formation and deposit, which you may be able to trace out in some measure by the aid of your lamp. At all events, if you cannot understand the deep mysteries of these things,

You may plod along as best you can,
The coals with your "black thorn" turning—
By the dusky miner's misty light,
And your lamp that is dimly burning.
You can see the remains of by-gone days
Enshrouded in mysteries shrine,
And return to earth with grateful heart
And your fossils most sublime.

During this tour of exploration for the wonderful, you can find the petrified remains of trees, ferns, and various plants, often in profusion, embedded in shale, forming the immediate covering of the coal that has been removed from the mine. This discovery will lead you to believe that a forest might have existed in the neighborhood at some period. By examining these fossils you will find that the

REMAINS OF TREES

thus found assume various forms, some standing upright as if they grew where they now are, others leaning in posture, while a few are lying on their side. By looking closely into these specimens you will see that those tree remains which stand upright are apparently perfect in original form; those which incline are moulded to the same position; and those fallen have evidently been crushed by some powerful pressure beyond recognition as trees, were it not for the fact that the rapid yearly growth of the tree is conspicuously visible. By comparison you will find that one of these pressed tree fossils looks exactly like a pane of slate color, heavy ribbed glass.

A few of these fossils are illustrated on the following page. The writer selected them from many others discovered in Springhill Mines, and

had them illustrated for the benefit of the reader. That marked—

No. 1 is a portion of the stem, with branches of the plant, called "*Alethopteris Lonchitica.*"

No. 2 part of the same plant (No. 1), showing closer arrangement of the leaves.

No. 3 is a *Sigillaria*—stem deprived of the bark.

No. 4 is known as "*Lepidodendron*"—stem of the plant having some of the bark on it.

No. 5 is a group of Calcite Crystals, of the variety called "Nail-head Spar."

Many other curiosities may be found in the pit, but you have probably seen enough to satisfy the mind that the mine is a wonderful place, and that coal must have connected with it a mystery which has never yet been revealed.

But after all, you have had only one experience of a coal mine. You have seen something of the operation of taking out coal, something of the ceaseless activity which pervades the working portions of the mine. But your visit to the mine has been at a time when hundreds of men are busy around you, when the rumble, the click, the tap, the noise of blasting, the sound of human voices are incessant. If you were there alone, the only living being in the

FOSSILS FOUND IN SPRINGHILL COLLIERIES.

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mine, you would experience different sensations. If you stood or sat motionless you would find the silence oppressive. One who has not had this experience can have no adequate conception of the

PROFOUND STILLNESS OF A DESERTED MINE.

On the surface of the earth one cannot find a time nor a place in which the ear is not assailed by noises; the stirring of the grasses in the field at midnight sends sound-waves travelling through space.

Where there is life there is motion, and where there is motion there is sound. But down here there is no life, no motion, no sound. The silence is not only oppressive, it is painful; it becomes unbearable. No person could be long subjected to it and retain his reason; it would be like trying to live in an element to which the human body is not adapted. Suppose you are not only in silence, but in darkness. As you are aware, "there is no darkness on the surface of the earth that is at all comparable with the darkness of the mine. On the surface the eyes can grow accustomed to the deepest gloom of night. Clouds cannot shut out every ray of light from hidden moon or stars. But down in the mine, whether in night-time or day-time, there is no possible lighting up of the gloom by nature;

she cannot send her brightest sunbeam through hundreds of feet of solid rock. If one is in the mines without a light, he has before him, behind him, everywhere, utter blackness. To be lost in this way, a mile from any opening to day, in the midst of a confusion of galleries, in an abandoned mine, and to be compelled to feel one's way to safety, is a painful experience," which none would wish to repeat. Such experience was doubtless more than realized by some of those in the mine at Springhill after the explosion when the lamps had gone out.

Before departing from this scene, a glance at the workings of the mine will not be uninteresting.

CHAPTER XXIII.

Mechanical Operations of the Pit.

Having surveyed the mysteries of the mine, the natural desire is to know how it is operated. Coal mining seems to be an art with which there is much obscurity connected, and a real knowledge of the mechanical operations of the mine can only be acquired by practical observation. Previous to all mining operations a knowledge of the existence of the coal stratum must be acquired by the operator. A wise man will never open a shaft down to a coal mine until assured that the coal bed exists in the underground vicinity. This assurance can only be gained by close investigation. Where coal is imbedded in the earth, the surface generally indicates its presence by the peculiarity of the earth or rock strata, and geological study reveals this peculiarity.

Satisfied, by surface indications, that coal exists in the neighborhood, a rigid search is commenced in order, if possible, to find the "outcrop." Every valley, crevice, stream, bank, ledge and knoll in the vicinity is carefully examined, and if no exposure of coal seams can be found, the boring process is

resorted to. This process is accomplished by boring holes down through the rock strata until the coal is reached. This operation is called

"PROSPECTING."

In the early days of prospecting, hand drills were generally used for this purpose, a sand pump drawing out the borings to be examined. The next method was that of the spring-pole, and afterwards came that of the rope method. All of these methods have been superseded by the diamond rotary cutting drill. This instrument cuts in the form of a circle, and makes an annular groove in the rock, forming a core. This core is brought up with the drill, and can be examined in vertical section. By boring down to and through the coal seam in various places its thickness and dip can both be ascertained, thus enabling the operator to form an estimate as to the value of the property and expense involved in developing the mine.

After finding the coal seam, the next important inquiry is how to reach it. This inquiry is much easier answered to-day than it was in the days of primitive coal mining, when a large hole like a farmer's well was cut down in the rock until the coal bed was reached, when the coal was dug and

hoisted to the surface in a bucket, or other stout vessel, by means of a common windlass, and work continued until the water collected too deep for comfort, when the pit was abandoned and a new pit dug for continuing operations. The opening was then, as now, called a "shaft."

During those early days of coal mining another mode of removing coal from its bed was by means of what was called

THE "DRIFT."

This was the most favorite mode, and is still continued in some sections under a modernized form. This mode is given by one who was familiar with the operations, thus:

"Finding an exposed seam of coal in the face of a ledge or cliff, they would dip in on it and bring the coal out from the opening in wheelbarrows. A place was selected, if possible, where a creek or river ran at the base of the ledge, and the coal was dumped from the wheelbarrow directly into the boat. In default of a water-way, a wagon road was built at the foot of the hill or cliff, a platform extending out over it, and the coal was thus loaded from the wheelbarrow into the wagon."

This drift method was evidently a simple way of

mining coal, and saved all expense of sinking shafts, constructing hoisting machinery, and even saved the cost of pumping gear, as the mine must have been self-draining, being on the elevated bank of a brook. However, as coal is now seldom found in such a place, this drift method is not much practiced, and would be impracticable in reaching a coal seam one thousand feet below the surface.

The miner, having discovered his coal seam, commences to open

A Shaft

in order to reach it. If the mine is deep and the rock hard, the operation may cost him $50,000. The first thing to be done in commencing to open a shaft, if the rock is not on the surface, is to dig out a rectangular space in the ground until the solid rock is reached. This space is dug about six feet wider and longer than the space intended for the shaft. When the rock is reached a foundation is gained, and on this foundation a cribbing of timber or solid masonry is built on all sides of the opening up to the surface to protect the earth from falling into the shaft when opened. After constructing the cribbing the rock is then cut in a downward course until the coal is reached.

Having reached the bottom of the coal seam, the operator then cuts from each side of the shaft, and at right angles to it, a passage through the coal about twelve feet wide to form the beginning of passages known as "gangways." Another passage is next cut from each end of the rectangular foot of the shaft, about half the width of the others, in order to form the commencement of what is called the first "cross-heading." After these excavations have been made, passages at the extremities of the cross-headings are driven parallel to the gangways for the formation of airways. After the shaft has been sunk, and these chambers formed, the operator must be governed by circumstances how his mine is to be operated. There are several systems of laying out a mine for actual workings, but the general principle of operating all bituminous mines is said to be about the same. As a rule, the coal seam must be followed, no matter where it leads. As the mining engineer cannot go over the ground and form a line such as the civil engineer does for a surface road, he must advance the best he can, constructing as he progresses.

When a shaft has been sunk to the depth desired, the openings for the basin, which is to receive the mine water, must be made below the level of the

foot gangway, so that all the water of the mine may run into it. A pump must also be erected through the shaft to force this water to the surface. The airway is another essential that must be constructed in connection with the shaft. The indispensable sections of the shaft leading down into the mine are the carriage-way, the air-way, and the pump-way. The entire horizontal space of opening for a modern shaft leading to a coal mine is thirty feet long by twelve feet wide. In this space four compartments are made by constructing wooden partitions cross-ways between each compartment. These partitions are formed with stout timbers called "buntons." The ends of the buntons are let into the rock on each side of the shaft, running across the twelve foot space. They are placed at distances of four feet from each other, and against these buntons closely fitted boards are nailed down the whole depth of the shaft. A space of six feet at the one end is allowed for the pumping gear, and a ten foot space is partitioned off at the other end for the air-course, the two seven feet centre spaces being arranged for the cage platforms ascending and descending into and out of the mine.

Immediately over the top of this shaft proper machinery is erected for hoisting the coal. Steam-

power is also put into operation to work the machinery, and the coal is carried up this shaft in small wagons, which are placed on the cage platform at the bottom, and, on reaching the top, are removed to the "banking out" ground, dumped, and returned to the pit for refilling. While one cage, with loaded wagon, is ascending one side of the shaft, the unloaded one is descending. Where mining is done by shaft there is seldom any other way provided for the men to go into and out of the pit than by the shaft entrance.

If the outcrop of the coal has been discovered, and the dip over twenty degrees, an entrance to the mine is effected by means of a

SLOPE,

such as those of the Springhill mines. The slope is a passage into the coal seam similar to that of the drift, with the distinction that the drift is opened from the surface on the strike of the seam, while the slope is driven on its dip. In opening the slope the operator commences at the surface cutting a chamber in the coal to the width of about twelve feet, and the full depth of the seam, following the natural dip as far as he desires to go for extension to either side in order to operate the mine. As the opening of the

passage proceeds, the sides and roof are supported by a row of round timber posts at each side, and rafters across the top. These posts and rafters are called "booms" and "props." In opening the leading passages throughout the mine the same kind of timbering is generally used.

Adjoining this main slope three smaller passages are also cut down into the mine, forming downcast air-way, pump-way, and man-way. By looking at the plan of No. 1 Mine, Springhill, in the former part of this book, the arrangement of these slopes will be seen. It will also be seen by illustration on the following page that the main slope leading to the mine is laid with double line rail track for the purpose of hoisting the coal to the surface. The arrangement of this mode of raising coal will be referred to in another paragraph.

The Underground Workings

of the mine, although apparently complicated to one who is not acquainted with the arrangement, are all designed to work harmoniously into each other's service.

In this chapter the writer would gladly give a detailed description of the complete mechanical operations of the Springhill collieries; but as this could

MAIN SLOPE AND DUMP OF A COAL MINE.

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not be done in a limited space, and might prove uninteresting to the majority of readers, a plain outline of the general system of coal mining, it is believed, will be more interesting to all.

The design of the writer is to lay before the reader the practical operations of a coal mine in such a way that it might be understood by those who are not familiar with the arrangement of the mine.

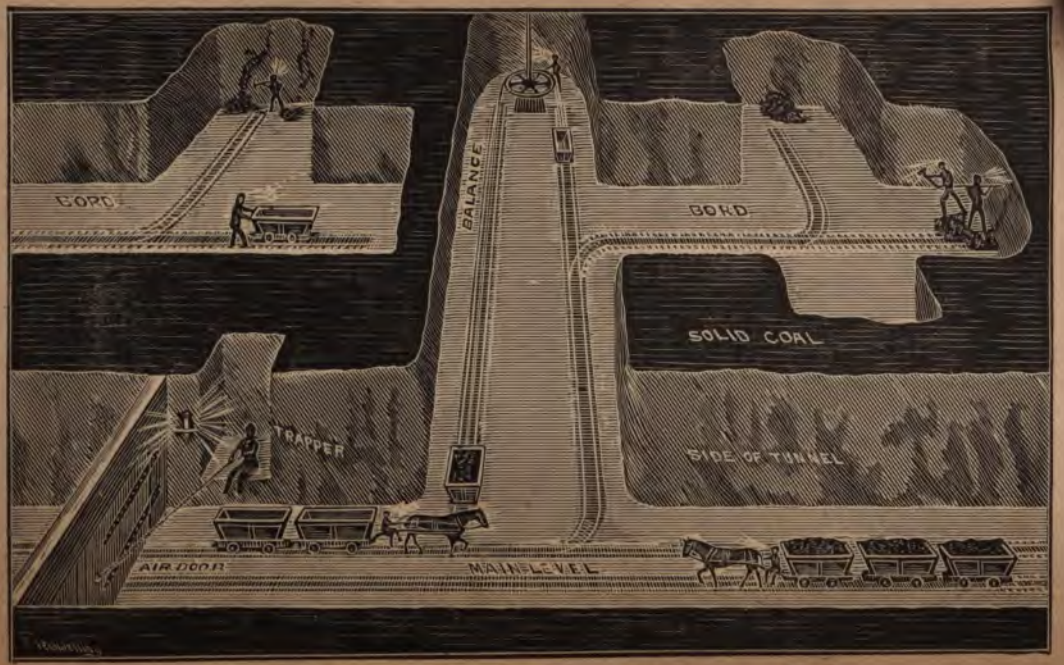
In order to understand the underground workings, the reader must bear in mind that the coal seam, in which the slopes referred to have been opened, dips into the earth from the surface at an angle of thirty-five degrees. In cutting the slope down this incline, the operator stops at a point where he wishes to make his

First Lift.

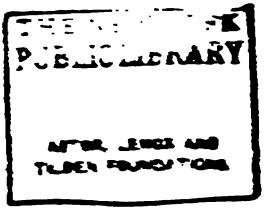
From this point, which is called the "bottom of the slope," a gangway is opened to the right or left, or both, as the case may be, and extending as far into the coal as desired. This gangway is called the "bottom level" of the first lift, and is driven across the coal seam on the level, or at least the under side of it is level. If the passage is opened twelve feet wide and the angle of the seam's dip be thirty-

five degrees, the upper side will be fully four feet higher than the lower side, if the coal is all removed from the underlying strata. However, it is called a "level" by the miner, and we must accept it as such.

After this level has been opened as far as desired across the coal seam, a similar passage is driven up from it into the coal towards the outcrop. This passage runs parallel with the main slope, and a good thick rib of coal is left standing between it and the slope for protection to each. This passage is called a "balance," from the fact that a balance-wheel or drum is constructed at the head for the purpose of conveying the coal down its grade to the bottom level. From the floor of this balance, side chambers are driven into the coal. These chambers run parallel with the main level, and are called "bords." When the coal is dug in these bords it is loaded in small cars or wagons, taken to the balance, and sent down to the main level. From these bords small shutes are sometimes opened, running up in a parallel direction with the balance. Illustration on the following page will give the reader an idea of the arrangement of these bords and balances, and their connection with the bottom level.



BOTTOM GANGWAY, BALANCE AND BORDS OF THE MINE.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After the first balance has been opened to a certain extent, another, at a farther distance along the level from the bottom of the slope, is formed in the same way, and beyond this others have their formation. These balances all run upwards from the main level at distances of about three hundred feet, and each balance has its connecting bords, shutes, or other chambers. The balances are all numbered from the bottom of the slope inward on the level, number one being the nearest to it. The bords are also numbered from the bottom upward. Farther reference to this matter will be seen on page 26.

Besides these balances, bords, shutes and main level, there is a water level below the main level for drainage purposes. An upper level or gangway is also sometimes formed, running along the head of the balances, and, in connection with all these, other excavations are made in various places throughout the workings. These passages are known as manways, gangways, counter-gangways, headings, cross-headings, break-throughs, inside slopes, etc., the whole forming an underground city, with its lanes, streets and other avenues, situated on the declivity of a steep hill-side, whose grade is about that of an ordinary slate or shingle roof of a house.

By considering this matter the reader will be able in some measure to form an idea of the difficulty of working in such a place. The method of working such a steep-pitching seam must be from the bottom of where the level is formed upwards. If the bottom level of the first lift is opened six hundred feet from the top of the slope, and the workings extend upwards five hundred feet, the coal will be mined to within one hundred feet of its outcrop. When the bottom level of the first lift has been extended as far as desired on each side of the slope, and the coal all taken out on the upper side as far as desired to go, with the exception of the portions left standing to prevent the roof from falling in, the slope is opened a few hundred feet farther down and a

SECOND LIFT

formed, and operations of the first lift repeated. The portions of coal left standing between the balances, bords and other chambers of the mine, are generally four feet in thickness. On working this second lift, the chambers running up from the bottom level are not extended so far as to break through into the excavations of the first lift. Between the two lifts a thick rib of coal is left untouched, known as the "chain pillar." This chain

pillar of solid coal protects the upper level of the lift from falls and crushes, and also prevents the water which accumulates in worked out portions of the mine above from getting down into the lift below.

After the second lift has been operated in the same way as the first, the slope is extended downward another five or six hundred feet, and the level of a third lift formed. When this third lift has been operated the slope is opened downwards farther and successive lifts are formed in the same way, until the cynical valley of coal stratum is reached, or, until the interior of the earth gets too hot for the miner to work with comfort. The temperature increases, it is said, one degree for every sixty feet of perpendicular descent into the interior of the earth.

If the mine is entered by shaft instead of slope, a shaft is sunk from the surface to the bottom of each lift, and operations conducted on the same principle as that of the slope.

Before leaving the mine, all the coal that can be raised has been taken out and the place is abandoned for ever and becomes a region of darkness and silence. The last operations of the miner before departure consists in breaking as much as possible from the ribs, pillars, and other portions of coal left standing during the time the active mining opera-

tions were going on. This work is commenced at the faces of the chambers, at the greatest distance from the main entrance to the mine, and progresses from that point until the whole workings have been completed.

This work is called "robbing pillars," and is one of the most dangerous acts of coal mining. It requires careful watching, as the rock overhead will crash into the chamber if the column is made too weak to support the roof. Without this work, however, a large amount of coal would be lost. It is estimated that about one-half the portions of coal left standing can be taken out by this robbing pillar system before the mine is totally deserted.

After all the coal that can be collected has been taken out of the mine, the tools and appliances are removed and the place is deserted. One who has had experience of this last mining operation says: "It is a waste of crushed pillars, fallen rock, and blocked passages. Indeed, it is difficult to conceive of anything more weird and desolate than an abandoned mine. To walk, or climb, or creep through one is like walking with Dante through the regions of the lost. There are masses of rock piled up in great confusion to the jagged roof, dull surfaces of coal and slate, rotting timbers patched here and

there, with spots of snow-white fungus; black stretches of still water, into which a bit of falling slate or coal will strike, and send a thousand echoes rattling through the ghostly chambers. For a noise, which on the surface of the earth will not break the quiet of a summer night, down here will almost make your heart stand still with fear, so startling is it in distinctness."

By carefully considering the quantity of coals that must be imbedded in a few square surface miles of seam ten or twelve feet thick, when mined in the way described, and considering that the Springhill coal field contains ten known seams lying under each other, we will not be surprised that the entire product of the field is estimated at fifty-six millions of tons. It will be seen by looking at the chart of these coal measures that three of the ten seams are now being operated. These are known as the "North Slope," the "East Slope," and the "West Slope."

The most common way of extracting coal from its bed is by means of picking, prying and blasting. Two miners and two laborers generally work in one chamber, and their outfit for operations chiefly consists of lamps, picks, shovels, hammers, sledges, crow-bars, drills, and some blasting material.

When the coal is first moved at the face of the chamber it is in large portions, and must be broken into smaller pieces; but this is not difficult, as the vertical planes of cleavage are at right angles to each other, and the stratification almost horizontal. When broken, the coal takes a cubical form, large blocks being composed of smaller cubes, and these of still smaller to the limit of the smallest particle.

When the coal has been mined and broken at the

FACE OF THE CHAMBERS,

and all slaty material separated from it, it is loaded into mine cars called "boxes," and taken to the main level, and thence to the bottom of the slope, whence it is hoisted to the surface of the mine.

The slope being laid with double line of narrow gauge rails, forming a tramway, and the principal underground excavations of the pit being laid by extension of the same line of rails, and all connected at the different points of intersection, the labor of conveying the coal from the place of mining operations to the dumping ground on the surface, seems on the whole to be simple and free from all complication. Apparently, the most difficult portion of transportation is in getting the boxes down the balance slopes to the level plane. This operation is

performed by means of a drum, situated at the head of the grade, with balance power. This power is so arranged that as the full box comes down the empty one is going up to get loaded. An idea of how this balance is operated, and its connections with side chambers and main level, and how the coal is conconveyed by horse power to the foot of the slope, may be had by referring to illustration on a former page. On a subsequent page, illustration will also give an idea of the mode of conveyance up the slope, and arrangement of dumping ground. The reader, in looking at this latter illustration, should remember that the earth and timbers of the slope are removed to show the interior, with empty cars going down and loaded cars being drawn up by the hoisting cable. It will be seen that the surface buildings are all cut away in order to show the track rising to the height of the dumping place, and the loaded cars running out to the extreme end of the dump. The staying supporting the dumping platform is also made so that the railway cars on the siding underneath and the screens might appear. This illustration is made to represent the upper portion of a slope similar to the 1,900 foot slope at Springhill, with the surface buildings and earth covering removed. The coal is drawn up this slope by steam

power, stationary on the surface at the outcrop in boxes filled by the miners at the section pits where it is dug. These boxes contain about 17 cwt. each, and are hauled by horse-power from the bottom of the main incline sections of the pit to the foot of the slope, where the machinery cable is attached, and on their arrival at the bank head the cable is disconnected and they are conveyed out to a place called

"THE TIPPLE."

As the opening of the slope is on the same level, if not a little higher than the floor of the tipple, a small effort is needed to get the cars to the dumping place after they arrive on the surface. The number of cars forming one hoisting rake is generally seven; but powerful winding engines are being introduced at some mines capable of hoisting from twelve to fifteen boxes from a depth of five thousand feet. At this place the coal is dumped down a grade, running over screens placed underneath, and finally reach the different coal cars according to grade. These cars are standing on a railway siding beneath the screens, awaiting the reception of the coal, and when they are filled they are removed and replaced by others. The tipple is generally a large, rough

frame building, constructed upon stout timber posts. The floor is about thirty feet higher than the railway track, which is constructed beneath the outer end of it. A platform on the floor of the tipple building is so adjusted by a single shaft, that when a loaded car is pushed on it, it tips forward to an angle of about thirty degrees. The end gate of the car is opened, and when dumped the coal runs out on to the screens. These screens are made of longitudinal iron bars, inclined outwardly, and at distances apart to allow the grade of coal desired to run through them. The coarse coal, after passing over the first set of bars, runs directly into a car standing on the track at the extreme end of the grade. The coal which passes through the first set of bars falls on to a second screen and passes along into a car placed in position to receive it. As many screens as desired are arranged in the same way, and at some collieries the bars are being superseded by revolving screens, which are said to do the work much better.

In hauling the mine cars to the bottom of the slope, the horses are driven by boys who usually take in four empty cars and bring out the same number of loaded ones. The horses are kept in stalls cut in the coal stratum near the foot of the slope. When the boy gets his horse hitched to a trip of

cars he climbs into the forward car, with lamp attached to the front of his cap, cracks his whip, and proceeds along the level into the darkness, shouting or whistling as he feels inclined, to keep up his courage. If the grade of the mine is not too steep when he reaches the foot of the first chamber he is to supply, he unfastens the front car from the others, drives the horse up the incline with it, and leaves it near the face to get filled; the other empty cars are distributed in the same way. On a siding of the level at the foot of the last chamber visited he finds a loaded car, to which he hitches his horse and starts on his return trip to where he started with his empty cars, picking up other loaded cars on his way to make up his complete rake. If the grade of the mine is steep, the empty cars are left at the foot of the incline chambers, and are taken up by balance power to the working chambers to be loaded, or filled, on the level siding with coal which has been mined and run down in shutes. At intervals along the main level there are sidings for this purpose and where rakes going in opposite directions may pass.

The position of driver boy in a coal mine is the miner's first step of advancement. Having entered the mine as a little

"TRAPPER,"

he graduates to the advanced position of driver, and afterwards to higher positions. The term trapper is derived from trap-door, placed as an air door for the purpose of controlling the ventilating current. At this door the little trapper must stand or remain like a sentinel from the time the first rake of cars passes in in the morning until the last comes out at night. His duty is tiresome and monotonous. He is alone all day, save when other boys and men pass through his door. His abode is a hole cut in the rib of the passage, and, as his light is dim and often goes out, he can do little to amuse himself but whistle. To save his oil, the little fellow often works in the dark. When he hears the sound of a footstep or wagon approaching his door his duty is to pull on a string, one end of which is attached to the door and the other secured where he can grasp it in a moment, when the door will open. After the passengers or cars have safely passed, by slacking the rope, the door shuts of its own accord. The trapper boy is generally contemplative and quiet. An observant spectator says of the little trappers: "Sitting so long alone in the darkness they become thoughtful, sober, sometimes melancholy. They go silently to their homes, when they leave the mine; they do not stop

to play tricks or joke with their fellows; they do not run, nor sing, nor whistle. Darkness and silence are always depressing, and so much of it in these young lives cannot help but sadden without sweetening them."

With a knowledge of such facts should every Christian philanthropist not pray and labor for the day to come when the blooming cheek of childhood shall not be soiled, nor the happy smile suppressed by the labor of the mine?

Viewing this matter from the standpoint of the advantages hitherto gained for the working classes by the advance of Christian civilization, are we not encouraged to hope that at no distant day the driver-boy and his horse in the mine will be superseded by the motive power of electricity, and the trapper captive freed by some contrivance of genius operating in his place? A good authority, referring to this latter idea, says: "By a skilful application of the regulator and air-crossing, the use of air doors has been abandoned in some of the best ventilated coal mines. Where there is an abundance of fresh air carried forward there is no necessity for them. It is only the mines inadequately supplied with air through the insufficiency of airways that are termed 'fiery.' Where there is not an abundance of air,

the lame method of using doors to force the little air in circulation here and there and everywhere is resorted to. Plenty of capacious passages will furnish an amount of air in proportion to their capacity."

In order to circulate a live current of air in a mine, various methods have hitherto been employed. The earliest method of creating an artificial air current, which should be constant, is that of the open furnace. This furnace resembles an ordinary old-fashioned fire-place with stout grate bars. It is constructed near the foot of an opening into the mine, and furnished with a smoke-flue built of brick. This flue leads into the air passage of the surface opening at some distance above the floor of the mine. The volume of heat from this furnace passing into the airway creates and maintains a strong upward air current. In some mines the furnace is built at the foot of an air shaft a long distance from the main opening, thus making it an upcast air shaft. By the continued use of a huge fire in this furnace a powerful current of air may be put and continued in motion, but it is found an expensive way of "raising the wind," and the system is rapidly giving place to another in the shape of the

ROTARY STEAM FAN.

This fan is a large wheel without a rim, and, instead

of spokes, it has blades like a windmill. It is placed on the surface over the downcast airway of the shaft or slope leading to the mine. It is operated by steam power, and revolves with tremendous force. Its average revolutions are given as being about forty per minute, and, if the surroundings are favorable, every revolution is said to send 5,000 cubic feet of atmospheric air into the mine.

Of course, the quantity of air forced into the mine by the operation of this wheel depends, to a great extent, on the size of the fan, and the space of the ingress air passage. Two hundred cubic feet of air per minute to every man in the mine is considered the amount necessary for perfect respiration, and as this fan is capable of supplying 500,000 feet per minute, the quantity would be sufficient for 2,500 miners. It is therefore obvious that so long as this fan and the air passages are in good working order, there need be no fear of lack of proper ventilation in the mine.

The atmospheric air, after descending into the mine, is distributed through all the working chambers by means of airways, cross-headings, and other passages, which are all arranged so as to insure its general circulation. When desired to force a certain quantity of air with rapidity to any particular

portion of the mine, a "brattice," or board partition, is constructed across the passage. A sheet of coarse canvas, called brattice cloth, is sometimes used for this purpose, being lighter and more easily handled than the boards.

Upcast Air Shafts,

are opened in various sections of the mine. These shafts are formed like a large flue, with their openings on the surface, and extending from the underground workings, thus giving vent to the air current, after it has circulated through the mine, to carry all impurities which it has collected in its course out with it into the open air. The surface construction of this shaft is called a "cupola."

The next important matter to that of ventilation in the mine is the

Matter of Drainage.

The accumulation of water in many mines surpass in weight the tonnage of coal raised. In some wet districts several tons of water is taken out to every ton of coal hoisted. The reader will be able to form some idea of the vast quantity of water that must collect in some mines in wet regions by the fact that the dam of the Springhill collieries has capacity for nearly four and a half million gallons.

In the system of drainage the dam, or what is called the "Sump," is made by opening a drainage level a short distance below the bottom level, or gangway, with connecting reservoir channels.

As the workings of the mine are all above the bottom level, and the water level below it, and the floor of the mine throughout graded so that all the water will gravitate to a certain point, the water naturally collects in the lower ground where the basin is made to receive it. From this cistern the water is pumped up through the compartment of the slope or shaft, known as the "pump-way," and discharged on the surface. If the underground workings discharge a free flow of water, it will require a powerful steam pumping engine located at the surface to keep the bottom level from being overflowed. The most powerful of these pumps, it is estimated, will throw out a volume of 1,200 gallons of water per minute. The copious flow of water coming from a mine soon forms a brook, the waters and banks of which present the appearances of a sulphureous spring.

In addition to the pumping and fan engines a

HOISTING ENGINE

is in operation in the immediate vicinity of the

mouth of the main slope, or shaft, leading to the mine. Carpenter's shop, forge, furnace rooms and other buildings, covering the whole surface plant of the mine, are all constructed in the same neighborhood, and give the place a lively appearance. An idea of what these buildings really are may be formed by looking at the illustration on a former page, of Engine House and Carpenter's Shop at No. 1 Slope, Springhill. It will be seen that other buildings besides those shown in the illustration are situated in the background, and must cover quite a space of territory. Among these buildings is a large one for the workmen, as a shelter from the storm. One is a fire-engine house, where hose, buckets, and other apparatus for extinguishing fire are stored. A machine shop is also included, where drills, lathes, planes, and other essential implements are kept ready for use at any time. The drills and picks are daily being sharpened at the forge, as without these the miner could not operate to advantage. In

HOISTING COAL BY SHAFT,

heavy upright timbers, from thirty to fifty feet in height, are set up, inclosing the opening. These timbers are well braced and united by cross-beams. This structure is called the "head-frame," and on

its top are placed large upright wheels, known as "sheaves." The steel or iron wire hoisting cables, which connect with the cages, run over these wheels, and extend from them to the drum in the engine-room, around which they are coiled in such a way that as one is being wound up the other is being unwound. Owing to this arrangement, as one cage descends into the shaft the other ascends by virtue of the same movement of the engine.

The arrangement of the cage is similar to that of a modern elevator. The ordinary cage consists of a stoutly built wooden platform, with vertical posts at the middle of the sides, united by a cross-beam at the top. To the middle of this beam is fastened the end of the wire cable, from which it is raised and lowered. On the cage platform a rail-track is laid corresponding with that at the bottom of the shaft. When the cage descends the mine track is continuous with that on the platform, and the loaded mine car is pushed on to the platform and securely fastened, when the up-movement commences. On arrival at the mouth of the shaft, the car full of coal is run by two headmen from the cage platform to the tipple, the rails being laid to correspond the same as those below.

Many other contrivances of the mechanical oper-

ations of the mine might be referred to did space permit, but enough has been stated to give the reader an idea of the general workings of a colliery; and any reader of this book who has not been to a coal mine, and should ever have an opportunity of exploring that gloomy region and its surroundings, will doubtless be able to express their experience in the language of the Queen of Sheba when visiting the court of Solomon: "Howbeit I believed not the words, until I came, and mine eyes had seen *it:* and behold, the half was not told me." As scarcely any two mines are worked exactly on the same principle, it is impossible, in writing, to give more than a general description of the mechanical operations of coal mining. In reference to this matter, one of extensive experience states: "There is scarcely a mine of any importance in the entire coal region in which one cannot find some new contrivance, some ingenious scheme, some masterpiece of invention devised to meet some special emergency which may have arisen for the first time in the history of mining." In closing this chapter, the writer would say that one-half of what an observant spectator may see in and about an extensive coal mine cannot be comprehensibly recorded in any book.

Glossary of Terms Used by Miners.

After-damp. The gases resulting from combustion of fire-damp.

Air Shaft. A vertical opening into a mine for the passage of air.

Airway. Any passage in the mine along which an air current passes; but the term is commonly applied to that passage which is driven, for ventilating purposes, parallel to and simultaneously with the gangway.

Anticlinal. A fold of strata in which the inclination of the sides of the fold is from the axis downward.

Bankhead. Surface of the mine.

Balance. An incline chamber running up from the main gangway with balance power at the head.

Barrier Pillars. Large pillars of coal left at a boundary line, or on the outskirts of a squeeze.

Battery. In steep-pitching seams, a wooden structure built across the shute to hold the mined coal back.

Bearing in. Cutting a horizontal groove at the bottom or side of the face of a breast.

Bed. Any separate stratum of rock or coal.

Bench. A horizontal section of the coal seam, included between partings of slate or shale.

Black Damp. Carbonic acid gas; known also as choke-damp.

Blossom. Decomposed coal, indicating the presence of an outcrop.

Blower. A forcible and copious discharge of gas from a cavity in the coal seam.

Bord Room. A side chamber running from a balance incline.

Bony Coal. Coal containing in its composition slaty or argillaceous material.

Boom. A rafter used in supporting the roof of a mine chamber.

Bore-hole. A hole of small diameter drilled or bored in the coal; usually, a hole drilled for prospecting purposes.

Box. A mine car or wagon in which coal is taken from the mine.

Brattice. A partition made of boards or of brattice cloth, and put up to force the air current to the face of the workings.

Break-Through. A cross-heading or entrance, used in the mine.

Breast. The principal excavation in the mine from which coal is taken; known also as chamber.

Broken Coal. One of the regular sizes of prepared anthracite.

Buntons. The timbers placed crosswise of a shaft down its entire depth, dividing it into vertical compartments.

Butt. The vertical planes of cleavage at right angles to the face cleavage.

Butty. A fellow-worker in the same chamber.

Cage. See Carriage.

Carriage. The apparatus on which coal is hoisted in a shaft.

Cartridge Pin. A round stick of wood on which the paper tube for the cartridge is formed.

Cave-Hole. A depression at the surface, caused by a fall of roof in the mine.

Chain Pillars. Heavy pillars of coal, lining one or both sides of the gangway, and left for the protection of that passage.

Chamber. See Breast.

Chestnut Coal. One of the regular sizes of prepared anthracite.

Choke-Damp. See After-Damp.

Cleavage. The property of splitting on a certain plan.

Coal Field. Extent of coal beds in any locality.

Coal Measures. Synonymous with coal field.

Collar. The upper horizontal crosspiece uniting the legs in the timbering of a drift, tunnel, slope, or gangway.

Colliery. All the workings of one mine, both underground and at the surface.

Conglomerate. The rock strata lying next beneath the coal measures.

Counter-Gangway. A gangway which is tributary to the main gangway, and from which a new section of coal is worked.

Creep. A crush in which the pillars are forced down into the floor, or up into the roof of the mine.

Cribbing. The timber lining of a shaft, extending usually from the surface to bed-rock.

Crop-Fall. A caving in of the surface at the outcrop.

Cross-Heading. A narrow opening for ventilation, driven through a wall of coal separating two passages or breasts.

Crush. A settling downward of the strata overlying a portion of an excavated coal seam.

Culm. All coal refuse finer than buckwheat size.

Dip. The angle which any incline stratum makes with a horizontal line.

Door-Boy. A boy who opens and shuts the door placed across any passageway in the mines to control the direction of the ventilating current.

Double Entry. One of the systems by which openings into the bituminous coal mines are made.

Downcast. The passage or way through which air is drawn into a mine.

Drift. A water-level entrance to a mine, driven in from the surface on the coal.

Drill. Any tool used for boring holes in the rock or coal.

Driving. Excavating any horizontal passage in or into the mines.

Drum. A revolving cylinder, at the head of any hoisting-way, on which the winding rope is coiled.

Egg Coal. One of the regular sizes of prepared anthracite.

Entrance. See Cross-heading.

Entry. The main entrance and travelling road in bituminous mines.

Face. The end wall at the inner or working extremity of any excavation in or into the mine.

Fan. A machine used to force a ventilating current of air through a mine.

Fault. A displacement of strata in which the measures on one side of a fissure are pushed up above the corresponding measures on the other side.

Fire-Board. A blackboard, fixed near the main entrance of a mine, on which the fire boss indicates each morning the amount and location of dangerous gases.

Fire Boss. An official whose duty it is to examine the workings for accumulations of dangerous gases.

Fire Clay. The geological formation which is usually found immediately underlying a coal bed.

Fire Damp. Light carbureted hydrogen.

Fissure. A separation of rock or coal across the measures.

Floor. The upper surface of the stratum immediately underlying a coal seam.

Gangway. An excavation or passageway, driven in the coal, at a slight grade, forming the base from which the other workings of the mine are begun.

Gas. Fire-damp.

Goaf. The waste left in worked out portions of the mine.

Gob. The refuse separated from the coal and left in the mine.

Guides. Narrow vertical strips of timber at each side of the carriageway in shafts, to steady and guide the carriage in its upward or downward movement.

Gunboat. A car used for hoisting coal on steep slopes.

Head-Frame. The frame erected at the head of a shaft to support the sheaves and hold the carriage.

Heading. Synonymous with gangway. Any separate continuous passage used as a travelling way or as an airway.

Hopper. A feeding shute or pocket in a breaker.

Horseback. A small ridge in the roof or floor of a coal seam.

Inside Slope. An incline plane in a mine, on which coal is hoisted from a lower to a higher level.

Jacket. One of the sections or frames of wire mesh of which a revolving screen is made up.

Keeps. Projections of wood or iron on which the carriage rests while it is in place at the head of the shaft.

Lagging. Small timbers or planks driven in behind the legs and over the collars to give additional support to the sides and roof of the passage.

Legs. The inclined sticks on which the collar rests in gangway, tunnel, drift, and slope timbering.

Level. See Gangway.

Lift. All the workings driven from one level in a steep-pitching seam.

Loading Place. The lowest extremity of the breaker, where prepared coal is loaded into railway cars.

Lump Coal. The largest size of prepared anthracite.

Manway. A passageway in or into the mine, used as a footway for workmen.

Mouth. The opening, at the surface, of any way into the mine.

Needle. An instrument used in blasting coal, with which a channel is formed through the tamping for the entrance of the squib.

Nut Coal. One of the regular sizes of bituminous coal.

Opening. Any excavation in or into a mine.

Operator. The person, firm, or corporation working a colliery.

Outcrop. That portion of any geological stratum which appears at the surface.

Output. The amount of coal produced from a mine.

Parting. The layer of slate or bony coal which separates two benches of a coal seam.

Pea Coal. One of the regular sizes of prepared anthracite.

Picking Shute. A shute in the breaker from which the pieces of slate are picked out by a boy as they pass down with the coal.

Pillar. A column or body of coal left unmined to support the roof.

Pillar and Breast. The name of a common mining method.

Pinch. See Crush.

Pitch. See Dip.

Plane. Any incline on which a track is laid for the purpose of lowering or hoisting coal.

Pockets. Receptacles at the lower ends of shutes, in breakers, from which coal is loaded into railway cars.

Prop. A wooden post to support the roof of a mine.

Prospecting. Searching for indications of coal on the surface, and testing coal seams from the surface by boring.

Pump Way. That compartment of a shaft or slope down which the pump rods and pipes are extended.

Rake. Number of cars constituting a trip, drawn at one time by any motive power.

Rib. The side of an excavation as distinguished from the end or face.

Rob. To mine coal from the pillars after the breasts are worked out.

Rock Tunnel. A tunnel driven through rock strata.

Rolls. In breakers, heavy iron or steel cylinders set with teeth, used for breaking coal.

Roof. The stratum immediately overlying a coal seam. The rock or coal overhead in any excavation.

Room. Synonymous with breast or chamber

Safety Lamp. A lamp that can be carried into inflammable gases without igniting them.

Scraper. A tool used for cleaning out bore holes in blasting.

Screen. Any apparatus used for separating coal into different sizes.

Seam. A stratum of coal.

Separator. A machine for picking slate.

Shaft. A vertical entrance into a mine.

Sheave. The wheel in the head-frame of a shaft that supports the winding rope.

Shift. The time during which a miner or laborer works continuously, alternating with some other similar period.

Shute. A narrow passageway through which coal descends by gravity from the foot of the breast to the gangway; an inclined trough, in a breaker, down which coal slides by gravity.

Single Entry. One of the systems by which bituminous mines are entered.

Slack. The dirt from bituminous coal.

Slate Picker. A boy who picks slate from coal. A machine used for the same purpose.

Slope. An entrance to a mine driven down through an incline coal seam. Inside slope: a passage in the mine driven down through the seam, by which to bring coal up from a lower level.

Slope Carriage. A platform on wheels on which cars are raised and lowered in steep slopes.

Smut. See Blossom.

Split. A branch of a ventilating air current.

Spread. The bottom width of a slope, drift, tunnel, or gangway between the legs of the timbering.

Squeeze. See Crush.

Squib. A powder cracker used for igniting the cartridge in blasting.

Steamboat Coal. One of the regular sizes of prepared anthracite.

Stopping. A wall built across any passage to control the ventilating current.

Stove Coal. One of the regular sizes of prepared anthracite.

Strike. The direction of a line drawn horizontally along any stratum.

Stripping. Mining coal by first removing the surface down to the coal bed; open working.

Sump. A basin in mines entered by a slope or shaft, in which the water of the mine is collected to be pumped out.

Swamp. A depression in the seam.

Synclinal. A fold of strata in which the inclination of the sides is from the axis upward.

Tipple. A building in which coal is dumped, screened, and loaded into boats or cars.

Trapper. See Door Boy.

Travelling Way. A passageway for men and horses in or into the mines.

Tunnel. An opening into a mine driven horizontally across the measures.

Under-Clay. See Fire Clay.

Underholing. See Bearing in.

Upcast. An opening from a mine through which air is taken out.

Vein. Used (improperly) synonymously with seam, bed, or stratum.

Wagon. A mine car.

Waste. Gob; coal dirt.

Water Level. An entrance into or passage in a mine, driven with just sufficient grade to carry off water.

White Damp. Carbonic oxide.

Wings. See Keeps.

Working Face. A face at which mining is being done.

Workings. The excavations of a mine, taken as a whole; or, more particularly, that portion of the mine in which mining is being done.

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